



*Update in September  
by November 15*

## **POLICY ISSUE** **(Information)**

March 29, 1990

SECY-90-121

For:

The Commissioners

From:

James M. Taylor  
Executive Director for Operations

Subject:

SITE DECONTAMINATION MANAGEMENT PROGRAM

Purpose:

To provide the Commission with the Site Decontamination Management Program (SDMP), which is the staff's response to Item Number 2 and initial response to Item Number 3 of the Commission's staff requirements memorandum (SRM), dated January 31, 1990.

Background:

In SECY-88-308 and in SECY-89-369, the Nuclear Regulatory Commission (NRC) staff listed over 30 material facilities sites which have a sufficient level of contamination to require special attention from the staff. To date, the known contamination at the sites has not been shown to be causing adverse effects on public health and safety, however SECY-89-369 indicated that the sites must be decontaminated or stabilized before the applicable license can be terminated. These sites vary in the nature of the contamination, the viability of the organization responsible for performing the cleanup, and the current status of cleanup effort.

The SRM from Samuel J. Chilk to James M. Taylor, dated August 22, 1989, directed the staff to develop a comprehensive strategy for NRC activities to deal with these contaminated sites so that closure on cleanup issues is attained in a timely manner. In Item No. 2 of a subsequent SRM, dated January 31, 1990, the Commission directed the staff to "...submit a list of contaminated sites in order of priority including the name and location of the site, name of responsible party, condition of the site, schedule and description of the next step in site cleanup, and other pertinent information. The list should be accompanied by a discussion of criteria used to rank

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each site." Item No. 3 of the same SRM directed the staff to "...Submit to the Commission any proposal to terminate a license at a site with significant contamination within this coming year or where a site with such contamination has been cleaned for unrestricted release."

*FAN for each  
proposed release?*

This Commission paper transmits the SDMP that the staff has developed and intends to use to achieve the timely cleanup of the materials facilities sites identified in SECY-88-308 and SECY-89-369. The plan will likely evolve with time and be used to manage and track all decommissioning and decontamination activities for which the Office of Nuclear Material Safety and Safeguards (NMSS) is responsible.

Discussion:

The SDMP has been developed in response to a mandate from the Director, NMSS, and, in large part, also serves as a response to the SRM dated January 31, 1990. As described in this paper and in the SDMP found in Enclosure A, all the points made in Items No. 2 and 3 of the SRM are addressed. If schedules for license termination either advance or slip so that the listing of licensing terminations this coming year needs revision, the Commission will be informed. 

*Keep OCM informed  
of status of schedules.*

The objective of the SDMP Program is the timely cleanup of the sites listed in Enclosure A (and other contaminated sites included in the future) and the subsequent removal of the sites from the list. This objective is attained by implementation of the SDMP, which contains the following elements:

- a. Definition of project management plan;
- b. Identification of the sites requiring decontamination;
- c. Prioritization of NRC efforts in the review of the contaminated sites based on a combination of health and safety and program management issues;
- d. Schedule and resources needed for NRC actions on contaminated site cleanup;
- e. Resolution of policy and Synar hearing issues for SDMP implementation and minimization of future contaminated site problems.

Section B of Enclosure A contains the description of the project management plan to be used in the SDMP and includes: (1) overall program management; (2) specific

site project management; (3) scheduling of activities needed for timely cleanup and removal of sites from the list, and (4) provisions for updating the SDMP.

Section C of Enclosure A contains an identification of the sites requiring decontamination and includes: (1) the site description; (2) description of wastes and activity remaining on-site; (3) description of the radiologic hazard from remaining wastes and activity; (4) financial assurance required (including if there is a viable responsible organization); (5) status of decontamination activities; and (6) NRC actions needed and timing.

Section D of Enclosure A contains a description of the prioritization of NRC efforts in review of the contaminated sites and includes the approach for the ordering of priority and the actual priority listing of the sites to be reviewed. Factors used to establish the priority of the sites are based on a combination of health and safety and program management issues and are: (1) timeliness of action needed; (2) status of regulatory efforts; (3) knowledge of the responsible organization; and (4) Congressional commitments.

Although the prioritization puts public health and safety first, it is also a pragmatic approach which recognizes that in certain cases prompt NRC staff action may result in remedial action early and effectively, thus resolving simple issues with dispatch so that the SDMP does not become clogged with a growing list of minor actions.

While NRC resources will be expended on all of the sites, for ease of reference Section D also contains a priority listing of the sites into three groups referred to as Level A, Level B, and Level C. The Level A sites are those which will receive priority attention in use of NRC resources for completion of decommissioning. Levels B and C sites also have an impetus for completion of cleanup and NRC resources will also be expended on these sites, although not on as high a priority.

Placement of the sites in higher levels does not by itself imply a greater health and safety risk but rather recognizes the overall pragmatic approach of attaining timely cleanup by prompt NRC staff action. For example, a number of sites have completed or are in the process of completing certain steps in the decommissioning process and are listed in a higher priority level than other sites with similar radiologic hazard.

Sites identified as Level A sites are: Allied Signal (NJ); Chemetron (Harvard and Bert Avenues, Cleveland, Ohio); Gulf (Pawling, NY); Kerr-McGee (Cimarron, Cushing, West Chicago); Safety Light (Bloomsburg, PA); Texas Instruments (Attleboro, Mass); UNC Wood River Junction (RI); and West Lake Landfill (St. Louis, MO).

Sections E and F of Enclosure A address policy issues related to the cleanup of contaminated materials licensee sites that need to be resolved. Although the SDMP can proceed at this time to work toward cleanup of the sites on the list, resolution of these policy issues will provide a regulatory framework for more efficient and consistent licensing actions related to site decontamination and decommissioning in the future. In particular, two issues in need of and receiving prompt attention for resolution for effective implementation of the SDMP are development of residual contamination criteria and timeliness of cleanup rulemaking.

Section G of Enclosure A contains schedules for contaminated site cleanup and includes a description of the detailed steps involved in site cleanup. These steps are: (1) site or facility characterization; (2) submittal of the decontamination plan; (3) NRC's review of the plan; (4) NRC's approval of the plan; (5) decontamination activities in progress; (6) the final survey; and (7) anticipated timing for license termination. Potential problem areas which may inhibit site cleanup are also included in Section G.

Section H contains a discussion of the resources needed to implement the SDMP. The resources described in Section H are current estimates, are very preliminary in nature, and are being provided for information. The resources estimated do not represent a budget submittal for this activity. In order to complete the FY 1990 actions described in this paper, I intend to reprogram existing resources to this effort. Also, during the forthcoming Five-Year Plan update, resource requirements for FY 1991 - FY 1995 will be finalized and appropriate allocations made to achieve these important objectives.

*Reallocation  
of resources*

It is important to note that the placement of a site in a certain priority level may change over time as conditions change; that NRC efforts may be expended on any of the Levels A, B, or C sites on the list to achieve cleanup; and that expending NRC resources even for a Level A site may not always achieve resolution by dates originally scheduled, as there are situations where the responsibility for the next action may be with other parties, such as hearing boards. Within the bounds of existing constraints, however, timely cleanup action will occur if the SDMP is implemented.

*Commitments*

Based on current schedule estimates, it is anticipated that the following major actions will be completed in 1990:

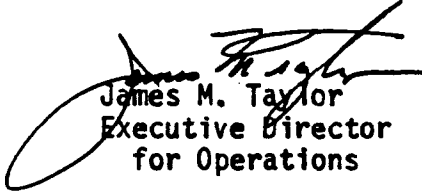
1) decontamination plans or site characterization plans for 11 sites will be submitted; 2) NRC will complete its review of decontamination plans for 7 sites; 3) a confirmatory survey for the complete site or a significant portion of the site will be completed at 5 sites; and 4) license termination will be aggressively pursued for 3 sites (Chemetron, UNC Wood River Junction and Amax) resulting in removal of two of those sites from the SDMP list.

Sites for which licenses are terminated will be reviewed by the Office of General Counsel to assure that appropriate conditions regarding potential future obligations and courses of action are included in the termination release.

The management of decommissioning activities is a continuing NRC obligation and there is a need for clear, consolidated NRC management attention to these obligations. With this first version of the SDMP, the staff has established identities, priorities, schedules, and lines of responsibility for some of the material license sites. In the future, the staff will develop similar definition for other sites until there exists such definition for the sites associated with all past and present NRC licensed activity. The next area of attention for the staff in this regard is the formulation of an additional element of the SDMP covering reactors which have been or are currently slated for decommissioning.

Coordination:

This paper has been reviewed and concurred in by the Office of Governmental and Public Affairs, the Office of Nuclear Regulatory Research, cognizant regional offices, the Office of Nuclear Reactor Regulation, and the Office of Enforcement. The Office of General Counsel has reviewed this Commission paper and has no legal objection.

  
James M. Taylor  
Executive Director  
for Operations

Enclosure:  
Site Decontamination Plan

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SITE DECONTAMINATION MANAGEMENT PROGRAM

March 1990

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## Site Decontamination Management Program

### A. Summary of Site Decontamination Management Program

#### 1. Objective of Site Decontamination Management Program

The objective of the Site Decontamination Management Program (SDMP) is the timely cleanup of the materials facilities sites listed in this report (and other contaminated sites identified in the future) and the subsequent removal of the sites from the list. This objective is attained by implementation of the SDMP, which contains the following elements:

- a. Definition of project management plan;
- b. Identification of the sites requiring decontamination;
- c. Prioritization of Nuclear Regulatory Commission (NRC) efforts in the review of the contaminated sites based on a combination of health and safety and program management issues;
- d. Schedule and resources needed for NRC pursuit of contaminated site cleanup;
- e. Resolution of policy and Synar hearing issues for SDMP implementation and minimization of future contaminated site problems.

The details of the overall SDMP and of each of the elements are described in this report.

#### 2. Background

In SECY-88-308 and in SECY-89-369, the NRC staff listed over thirty material facilities sites which have a sufficient level of contamination to require special attention from the staff. To date, the known contamination at the sites has not been shown to be causing adverse effects on public health and safety, however SECY-89-369 indicated that they must be decontaminated or stabilized before the applicable license can be terminated. These sites present a variety of situations including:

- a. Some sites have large piles of tailings or soil contamination with low levels of source material or other radionuclides; other sites have building contamination. These sites present varying degrees of radiologic hazard, cleanup complexity, and cost;

- b. Some sites involve active licensees whereas other sites involve formerly licensed sites, or sites where the responsible party is unable or unwilling to perform cleanup. This raises questions of whether there is a viable organization responsible for funding and carrying out the cleanup;
- c. Some licensees have already begun decontamination efforts or submitted decommissioning plans, whereas at other sites, no work has been done.

The staff requirements memorandum (SRM) from S. J. Chilk to J. M. Taylor, dated August 22, 1989, indicated that it is imperative that the staff develop a comprehensive strategy for NRC activities to deal with these contaminated sites, so that closure on cleanup issues is attained in a timely manner. In a subsequent staff requirements memorandum, dated January 31, 1990, the Commission directed the staff to "submit a list of contaminated sites in order of priority including the name and location of the site, name of responsible party, condition of the site, schedule and description of the next step in site cleanup, and other pertinent information. The list should be accompanied by a discussion of criteria used to rank each site."

### 3. Summary of Report

Section B of this paper contains the description of the project management plan to be used in the SDMP. Section C contains identification of the sites requiring decontamination. Section D contains the prioritization of the contaminated sites. Sections E and F discuss resolution of issues related to policy questions and the Synar hearing. Section G and H contain the schedules and estimated resources for the SDMP.

The description of the project management plan in Section B includes: (1) overall program management; (2) specific site project management; (3) scheduling of activities needed for timely cleanup and removal of sites from the list; and (4) provisions for updating the SDMP.

The identification of the sites requiring decontamination in Section C includes: (1) the site description (including hydrogeologic features, where known); (2) description of wastes and activity remaining on-site; (3) description of the radiologic hazard from remaining wastes and activity; (4) financial assurance required (including if there is a viable responsible organization); (5) status of decontamination activities; and (6) NRC actions needed and timing.

Section C references Appendix A, which has detailed discussions of each site, and also references Table 1, which is a summary description of the sites.

The prioritization of NRC review of the contaminated sites in Section D includes the approach for the prioritization and the actual priority listing of

the sites to be reviewed. Factors used to prioritize the sites represent a combination of health and safety and program management issues and are: (1) timeliness of action needed; (2) status of regulatory efforts; (3) knowledge of the responsible organization; and (4) Congressional commitments.

Although the prioritization puts public health and safety first, it is also a pragmatic approach which recognizes that in certain cases prompt NRC staff action may result in remedial action early and effectively thus resolving simple issues with dispatch so that the SDMP does not become clogged with a growing list of minor actions. Section D references Table 2. Section D.2 contains a prioritization listing of the NRC review of the sites in three groups.

Section G references Appendix A (Section 7) for a detailed discussion of the actions still needed to complete cleanup at each site. Section G also references Table 3 for a summary description of the schedules of the steps involved in site cleanup. These steps are: (1) site or facility characterization; (2) submittal of the decontamination plan; (3) NRC's review of the plan; (4) NRC's approval of the plan; (5) decontamination activities in progress; (6) the final survey; and (7) anticipated timing for license termination. Potential problem areas which may inhibit site cleanup are also included in Table 3.

Section G also contains a listing of sites expected to be removed from the SDMP list in 1990.

Section H contains a discussion of the resources needed to implement the SDMP. Section H references Table 4, which contains a summary of the resource estimates for the SDMP.

## B. Project Management Plan

### 1. Description

This section contains a description of the project management plan to be used by the NRC staff in the SDMP. As noted in Section A.1, the objective of the SDMP is the timely cleanup of the materials facilities sites listed in this report (and other contaminated sites identified in the future) and the subsequent removal of the sites from the list. This objective is attained by the following project management plan:

- a. Overall Program Management - The Division of Low Level Waste Management of the Office of Nuclear Material Safety and Safeguards (NMSS/LLWM) has the overall program management responsibility for the SDMP. NMSS/LLWM is the contact point for information on the SDMP and the overall status of the decontamination of the sites listed in this report. This includes the following: (a) maintenance and updating of the site listing in this report; (b) updating of the schedule of tasks for decontamination of sites which have been completed or rescheduled; (c) providing program direction and guidance to NRC organizations having specific site project management responsibility; and (d) removal of sites from the listing as licenses are terminated or necessary cleanup operations short of license termination are completed.
- b. Specific Site Project Management - Each site listed in this report has a specific project manager (PM) assigned primary responsibility for review and approval of decontamination and license termination activities. The name of the PM for each site listed in this report is included in Appendix A. Specific site project management is divided among the Division of Industrial, Medical and Nuclear Safety (IMNS), LLWM, and the regional offices. The specific plant PM is the contact point for detailed information on the decontamination of a site under his or her review.
- c. Scheduling of Activities Needed for Cleanup and Removal of Sites from the List - Schedules are established for the decontamination of each site listed in this report. The details of the schedules developed at this time are in each site's detailed writeup in Appendix A and are summarized in Table 3. The schedule information also includes potential site-specific problems which may inhibit cleanup. A milestone chart for each site listed as Level A in Section D of this report will be prepared by May 1990.

In addition to the schedule information in the previous paragraph, NRC will send a letter to the licensee or responsible party for each of the sites listed informing them of NRC's objective to proceed in a timely manner with cleanup of their sites.

- d. Updating of the SDMP - To assist in the updating of the SDMP, Tables 1, 3, and 4 will be maintained by cognizant PMs in NMSS and the

regional offices. As progress is made toward completion of decontamination or survey activities, staff will mark on these tables, in particular Table 3, and send them on a quarterly basis to LLWM in its capacity of overall program manager. LLWM will incorporate the changes into a master copy to be updated quarterly on an informal basis and annually on a formal basis. As sites are removed from the SDMP, they will be removed from the tables in this report. However, a separate short section will be added to the report, which contains a listing of those sites which were on the SDMP lists and why and when they were removed.

## 2. Criteria for Listing a Site in the SDMP

A site is listed in the SDMP list if it meets one or more of the following criteria:

- a. Problems with a viable responsible organization, e.g., inability to pay for or unwillingness to perform decommissioning;
- b. Presence of large amounts of soil contamination or unused settling ponds or burial grounds which may be difficult to dispose of;
- c. Long-term presence of contaminated, unused facility buildings;
- d. License has been previously terminated;
- e. There is contamination or potential contamination of the groundwater from onsite wastes.

Sites which have shut down and are in the routine process of decommissioning have not been added to the SDMP list. Also, sites which are operational and have contamination in operational portions of the facility also have not been added to the SDMP listing. By December 1990, the SDMP will be expanded to encompass all facilities, including reactors, that are in the process of decommissioning.

## 3. Criteria for Removing a Site from the SDMP

A site will be removed from the list if it meets one of the following criteria:

- a. The license has been terminated following acceptable cleanup;
- b. For sites that have an inactive, contaminated portion of the site requiring cleanup (e.g., a contaminated, inactive settling pond or building, or a large volume of contaminated soil), decontamination of the area has been completed and the license has been modified to reflect the cleanup.

### C. Identification of Contaminated Sites

This section contains a discussion of the detailed descriptions of the contaminated sites requiring decontamination or decommissioning. These detailed site descriptions provide: 1) a summary of the characteristics and problems associated with each site; and 2) a basis which the prioritization of the sites can be performed. Appendix A contains the detailed discussion of each site, and Table 1 contains a summary description of each site. The description of each site in Appendix A is broken down as follows:

1. **Site identification:** Includes the licensee name, location, and docket number, and NRC project manager.
2. **Site description:** Includes a description of the site, including the nature of the operations, number of process buildings, acreage, and, if applicable, nature of the groundwater system (aquifer depth, aquifer use, location of nearest drinking water well, existence of groundwater monitoring wells, groundwater sampling data, groundwater dose estimate).
3. **Description of wastes and activities remaining onsite:** Includes types of nuclides present, nuclide concentrations or exposure rates, and the likelihood for migration in airborne or groundwater systems (leachability, dispersibility, solubility, transportability, etc). If soil is contaminated, includes information on the depth of contamination. If disposals have taken place, includes information on disposal methods (e.g., burial, discharge into sewers or other drains, etc.) and wastes disposed. If not well-known, order of magnitude estimates are included.
4. **Description of the radiologic hazard from remaining wastes and activity:** Includes a statement of the basis for the hazard, including type of hazard (e.g., inhalation, ingestion, intrusion, groundwater, occupational) referencing the types of radioactive materials in the contaminated areas, and any actual or potential human exposure. Information on any known hazardous non radioactive waste is also presented.
5. **Financial assurance required/viable responsible organization:** Includes cost estimate and funding method, if known. This section also discusses whether a viable, responsible organization is capable of performing the cleanup and also identifies any problems involved, e.g., licensee bankruptcy, unwillingness to perform cleanup, presence on Superfund list.
6. **Status of decontamination activities:** Includes whether the licensee has submitted a plan, whether it has been approved, whether it is a generalized plan or if it specifically addresses the needed decontamination aspects, if a plan will be required at license

renewal, and if groundwater aspects were addressed. This section also includes whether the licensee is actively decontaminating the site and if so, what work has been completed on buildings, soil, ponds, etc.

7. NRC actions needed and timing: Includes the NRC actions needed to complete site cleanup and the schedule for this activity, if currently established (if not, the anticipated schedule is shown). Included in this section is a description of the next step in the site cleanup. Schedule details, including dates, are contained in Section 7 of Appendix A and are summarized in Table 3.

As noted above, Table 1 contains a summary description of the information in Items 1 through 5 in Appendix A. Table 1 combines the Items 2 and 5 described above from Appendix A and includes them under the heading "Site Description/Problems With Viable Responsible Organization." The table entry identifies (in capital letters) those sites which have problems with a viable responsible organization. Items 6 and 7 are summarized in Table 3.

Table 1 lists each site alphabetically under the appropriate prioritization level that it belongs to (see Section D.2 for a discussion of the prioritization levels).

There are five contaminated sites that are referenced in the U.S. General Accounting Office (GAO) report entitled, "NRC's Decommissioning Procedures and Criteria Need to be Strengthened," that are not included in this program plan. These sites are: NFS, Erwin, TN; UNC, New Haven, CT; Combustion Engineering, Hematite, MO; General Electric Company, San Jose, CA; and Westinghouse Electric Company, Cheswick, PA. These sites were not included for the following reasons:

1. NFS Erwin is a major nuclear fuel processor expecting to continue in business indefinitely. NFS Erwin is also pursuing diligently the decontamination of facilities and areas no longer in use for the purpose of removing them from the license. NRC review of this action is in progress and the schedule for completion is being developed.
2. CE Hematite is a major nuclear fuel processor with only minor site contamination which is not directly involved in ongoing operations. Although some waste has been buried on site, the site does not meet the criteria of B.2 for addition to the list. Section E.2 indicates that procedures for evaluation of acceptability of sites where previous burials took place are being developed.
3. The primary issue in the GAO report for Westinghouse-Cheswick, GE-San Jose, and UNC-New Haven, is incompleteness of survey records showing decontamination before license termination. Review of these sites will be undertaken as part of the study of the adequacy of the decontamination of licensed sites terminated after 1965 (see Section E.6 of this report).

Two sites listed in SECY-89-224, Homestake Mining Uranium Mill and United Nuclear Uranium Mill, are not included in this report as they are being addressed as part of the NRC's Uranium Field Recovery Office (URFO) review of Title II licensee reclamation of uranium mill tailings sites under Appendix A to 10 CFR 40. In addition, West Valley Nuclear Center in West Valley, NY, a contaminated site that will be decommissioned by the State of New York and the Department of Energy (DOE) (in consultation with NRC), is addressed by separate NRC actions not included in the report.



#### D. Order of Priority of NRC Efforts in Review of Contaminated Sites

##### 1. Factors Used to Prioritize Review of Sites

The order of priority of NRC efforts to be expended in review of contaminated sites to be decommissioned is based on a combination of health and safety and program management issues and is done by evaluating the following factors:

- a. Timeliness of action needed
- b. Status of regulatory efforts
- c. Knowledge of responsible party
- d. Congressional commitments

Although the prioritization puts public health and safety first, it is also a pragmatic approach which recognizes that in certain cases prompt NRC staff action may result in remedial action early and effectively, thus resolving simple issues with dispatch so that the SDMP does not become clogged with a growing list of minor actions.

For each of the listed factors, a weighted score is determined, as is discussed below. These scores are summed together and ranked so that the highest scores represent the highest priority for NRC staff action. Based on the scores, the contaminated sites are ranked into three priority groups referred to as Level A, Level B, and Level C.

##### a. Timeliness of Action Needed

Each of the contaminated sites represents a different radiologic hazard. These sites are contaminated with different radionuclides, have different activity levels and concentrations, and have different potential exposure pathways. To date, the known contamination at the sites has not been shown to be causing adverse effects on public health and safety. They will all, though, require cleanup or stabilization, before the licenses can be terminated and for the sites to be released for unrestricted use.

The factor representing the timeliness of the action needed reflects the need to decontaminate those sites that can become more contaminated or can contaminate other areas, if cleanup efforts are significantly delayed.

The timeliness priority is subjectively ranked as "high" or "low," depending on the overall toxicity of the radioactive species, the migration potential of the radioactive material, and the nearness to a potentially exposed population. For example, a site would have a "high" timeliness priority if nuclides such as plutonium or Sr-90 (nuclides with relatively high radiologic toxicities) contaminated a site adjacent to a river or overlay a shallow aquifer (higher migration potential) used for drinking water through nearby wells (near to a potentially exposed population). A site would have a "low" timeliness priority if the nuclides have low dissolution rates, are nondispersive and have low migration potential, have low contamination levels, contaminate areas over deep

or unusable aquifers, and are far away from human residences or drinking water supplies. A site with measured offsite contamination would have a higher timeliness priority ranking than one where no offsite migration has taken place, as would one where the nature or extent of the contamination is not clearly known.

A weighted priority score of two for the "timeliness of action needed" factor is assigned to those sites with a "high" timeliness priority ranking. A score of zero is assigned to those sites having a "low" timeliness priority ranking.

#### b. Status of Regulatory Efforts

As noted in Section A.2, the Commission has indicated in a Staff Requirements Memorandum dated 8/22/89 that it is imperative that closure on cleanup issues at the contaminated sites listed in this report be attained in a timely manner.

Based on the need for closure on cleanup issues at these sites in a timely manner, this factor addresses the status of regulatory efforts by taking into account the degree to which prompt NRC staff action may result in remedial action early and effectively, thus resolving simple issues with dispatch so that the SDMP does not become clogged with a growing list of minor actions. This will allow cleanup and survey actions to be completed by providing the licensee with timely NRC reviews and approvals. By giving consideration to this factor, it is unlikely that need for NRC action will be on the critical path for final cleanup, closeout survey, and license termination.

Sites which have completed or are in the process of completing certain steps in the decommissioning process and for which prompt regulatory action may result in remedial action early and effectively are given a "prompt" Status of Regulatory Efforts ranking and are assigned a weighted score of two. Other sites are assigned a score of zero for this factor. For example, a situation where a licensee has proposed to initiate cleanup or decommissioning action is rated as higher priority.

#### c. Knowledge of Responsible Organization

Some of the contaminated sites have never been licensed, or the licensee has gone into bankruptcy, or may be unable to fund the needed costs for site cleanup. A higher priority will be given to sites where a financially responsible organization is "unknown" (does not exist or may not exist soon. Sites where financially responsible parties are "known" (under licenses to large, financially secure organizations) will be ranked with a lower priority score. This ranking approach will accelerate cleanup at sites where marginal organizations may lose control over contaminated areas, where bankruptcy actions have taken place or may take place in the near term, or where responsible parties are questionable for other reasons, such as when a license has been previously terminated.

A responsible organization priority score of two is assigned those sites having an "unknown" priority ranking. A score of zero is assigned to those sites having a "known" priority ranking.

d. Congressional Commitments

The Commission has committed to prompt action on several sites in testimony before the Synar Committee on August 3, 1989, and in response to the U.S. GAO report to the House Committee on Government Operations, entitled "NRC's Decommissioning Procedures and Criteria Need to be Strengthened." Those sites are given a weighted priority score of one. Sites not subject to such a commitment are assigned a score of zero.

2. Order of Priority of NRC Efforts in Review of Sites

Based on the factors described in Section C.1 and on the site descriptions in Appendix A and Table 1, an ordering of the priority of the sites was performed. A summary of that ordering is contained in Table 2. While NRC resources will be expended on all of the sites, for ease of reference the sites have been grouped into three groups referred to as Level A, Level B, and Level C. These groups are defined as follows:

- Level A: Those sites which will receive priority attention in use of NRC resources for completion of decommissioning, for example, because there is a lack of knowledge of the responsible organization, and/or because there is a need for timely action in completing cleanup;
- Level B: Those sites which have a strong impetus for completion of decommissioning, for example, where prompt NRC staff action may result in remedial action early and effectively, and it is necessary to expend NRC resources for progress to be made;
- Level C: Those sites which have an impetus for completion of decommissioning, so that licenses can be terminated, and where the lowest discretionary NRC resources should be expended, on a routine basis.

The following is a listing of the sites in the three groups:

Prioritization of NRC Efforts in Review of Contaminated Sites

<u>Level A</u>	<u>Level B</u>	<u>Level C</u>
Allied Signal, NJ	AMAX	Advanced Medical
Chemetron (Harvard & Bert Avenues)	B&W Appollo	Army, Aberdeen, MD
Gulf, Pawling, NY	BP Chemicals	Budd
Kerr McGee, Cimarron	Cabot (Revere, Reading)	Cabot, Boyertown
Kerr-McGee, Cushing	Dow	Fanstee?
Kerr-McGee, West Chicago	GSA, Watertown	Mallinckrodt
Safety Light	Heritage	Nuclear Metals
Texas Instruments	Kawkawlin Landfill	Permagrain
UNC, Wood River Jct	Magnesium Elektron	Remington Arms
West Lake Landfill	Molycorp, Wash, PA	Shieldalloy, NJ
	Molycorp, York	Whittaker
	Pesses	
	Radiation Technology	
	Schott Glass	
	Shieldalloy, Ohio	
	Westinghouse, Waltz Mill	

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It is important to note:

- a. Placement of the sites in higher levels does not, by itself, imply a greater health and safety risk, but rather recognizes the overall pragmatic approach of attaining timely cleanup by prompt regulatory action. For example, a number of sites have completed or are in the process of completing certain steps in the decommissioning process and are listed in a higher priority level than other sites with similar radiologic hazard.
- b. NRC efforts may be expended on any of the sites on the list. For example, if there is an opportunity to expend NRC resources and thereby remove a Level B or Level C site from the list, that will be done as part of the SDMP.
- c. Expending NRC resources even for a Level A site may not always achieve timely resolution, as there are situations where the responsibility for the next action may be with other parties, or where litigation proceedings may delay the next scheduled action.
- d. The placement of a site in a certain priority level may change over time, as conditions change. For example, if the status of the organization responsible for a site becomes less viable, the site may be placed in a higher priority level group.

### E. Policy Issues Requiring Resolution

There are a series of policy issues related to the cleanup of contaminated materials licensee sites that need to be resolved. Although the SDMP can proceed at this time to work toward cleanup of the sites on the list, resolution of these policy issues discussed below will provide a regulatory framework for more efficient and consistent licensing actions related to site decontamination and decommissioning in the future. However, as is discussed in SECY-89-369, a policy issue that does require prompt resolution for effective implementation of the SDMP is preparation of the interim guidance in item 1, "Development of Residual Contamination Criteria." The policy issues discussed in this section also include issues raised during the Hearing on Decommissioning and Decontamination Requirements for Closing Nuclear Facilities, chaired by Congressman Synar, held on August 3, 1989. Congressman Synar chairs the Environment, Energy and Natural Resources Subcommittee of the Committee on Government Operations.

Policy issues requiring resolution are --

1. Development of residual contamination criteria
2. Previous disposals of wastes under 10 CFR 20.302 and 10 CFR 20.304
3. Use of Superfund
4. Development of a rule to require licensees to list in one document all land, buildings, and equipment involved in licensed operations
5. Development of guidance on the conduct of verification surveys
6. Review of licensed sites terminated after 1965
7. Development of a rule to require licensees to implement more stringent future decommissioning standards
8. Review and modification, if needed, of license termination procedures
9. Development of procedures for the follow-up and removal of unlicensed facilities from the SDMP list
10. Coordination with Agreement States on SDMP activities.
11. Consideration of a "reopener" clause to require additional decontamination
12. Review of test and research reactor license terminations.

In this section, the forementioned issues are discussed and a plan, including estimated schedules and an estimate of the resources for resolving these issues is presented. The estimated date for completion for some policy issue actions are shown as to be determined (TBD). Completion of these actions is of lower priority and will not affect NRC's ability to proceed with the SDMP. Completion dates for these actions will be established when they are assigned higher priority.

#### 1. Development of Residual Contamination Criteria

The residual contamination criteria will be established by performing the following tasks:

- a. development of interim guidance
- b. rulemaking
- c. review of 1981 uranium and thorium Branch Technical Position
- d. revision of Regulatory Guide 1.86

Details of these tasks are discussed in the following sections.

a. Development of Interim Guidance

Present regulations specifically pertaining to decommissioning and termination of license are contained in 10 CFR Parts 30, 40, 50, 70, and 72 and in NRC guidance documents and NRC staff guidelines. However, the NRC regulations do not contain generally applicable and definitive decontamination criteria. Licensed facilities are currently decontaminated with staff guidance written in the 1970's. The numerical guidance has not been updated and does not cover all situations.

The staff is addressing this problem by using the individual dose criterion in the policy on "Exemptions from Regulatory Control," to develop interim guidance and regulations specifically applicable to decontamination of sites. The Office of Nuclear Regulatory Research (RES) is developing interim decontamination criteria for Commission review. These criteria are supported by NUREG/CR-5512. The document, NUREG/CR-5512, was published in January 1990, and its availability was noticed with a solicitation for public comment during February 1990. Interim decommissioning criteria are expected to be transmitted to the Commission by late March 1990. A follow-up regulatory guide containing residual contamination criteria for soils and structures will be completed after public comments on the interim criteria for decontamination of soils and structures are evaluated and considered by the NRC. This regulatory guide will provide detailed guidance on a acceptable approach for demonstrating compliance with current license termination requirements for unrestricted release. The status of these efforts is discussed in more detail in the paper transmitting the exemption policy statement to the Commission (see SECY-89-360). This exemption policy statement was submitted to the Commission for review on December 1, 1989, and will be issued after the Commissioners' approval.

Certain naturally occurring radionuclides such as Ra-226, Rn-222, and uranium and thorium series radionuclides may be present at sites being decommissioned. The issue that needs to be addressed in the development of residual contamination criteria is the proper treatment of contamination consisting of uranium and thorium and daughters (including radon), taking into consideration the perspective of natural background and the regulation of the same radionuclides by EPA. The interim criteria incorporate the EPA standard (40 CFR 192.32(b)(2)(i)) permitting up to 5 pCi Ra-226 per gram of soil. This issue will be included in the development of the regulatory guide on residual contamination criteria for license termination and the rulemaking codifying residual contamination levels.

NRC actions needed to develop updated guidance and criteria for decontamination are as follows:

Estimated Date

- i. Issuance of the policy statement on exemptions from regulatory control  
(Lead: RES; Support: LLWM, IMNS, Office of Nuclear Reactor Regulation (NRR), Regions;  
Resources: 3 staff-months for RES,  
2 staff-weeks each for LLWM, IMNS, NRR,  
Regions)

May 1990

- ii. Issuance of interim criteria for soils and structures for public comment (Lead: RES; Support: LLWM, NRR, IMNS, Regions; Resources: 3 staff-months for RES, 2 staff -weeks each for LLWM, NRR, IMNS, Regions) July 1990
- iii. Publication of final NUREG/CR-5512, technical basis for the interim guidance (Lead: RES; Support: LLWM, NRR, IMNS; Resources: 6 Staff-months for RES, 1 staff-month each for LLWM, NRR, IMNS) December 1990
- iv. Regulatory Guide 1.XX on residual contamination criteria for license termination for soils and structures (Lead: RES; Support: LLWM, NRR, IMNS, Regions; Resources: TBD staff-months) TBD

An issue needing resolution is the potential that cases may need to be reopened after their licenses are terminated based on future standards development. This issue is discussed below in Section E.11.

#### b. Rulemaking

RES has the lead in current rulemaking activities for decommissioning of nuclear facilities. On June 27, 1988, NRC published final rules on "General Requirements for Decommissioning Nuclear Facilities" (53 FR 24018). The rule amendments cover a number of topics related to decommissioning that would be applicable to 10 CFR Parts 30, 40, 50, 70, and 72 applicants and licensees. These topics include decommissioning alternatives, planning, assurance of funds for decommissioning, and environmental review requirements.

The Supplementary Information to the final rule on decommissioning indicated that NRC was developing residual radioactivity criteria for termination of licenses. The actions described in E.1.A above address the development of these residual radioactivity guidelines. This guidance will be the basis for the development of more detailed regulations in a rulemaking to be initiated to implement the exemption policy developed in Section E.1.A. On May 26, 1989, R.M. Bernero, Director, NMSS, in a memorandum to E.S. Beckjord, Director, RES, requested that RES initiate action to develop implementing rules after issuance of the exemption policy statement. In its action plan, RES has identified this activity as "highest priority."

## NRC actions will be to --

Estimated Date

- i. Plan and initiate the rulemaking process  
(Lead: RES; Support: LLWM, IMNS  
Resources: 1 staff-month for RES,  
1 staff-week each for LLWM, IMNS) May 1990
- ii. Issue proposed rule for comment  
(Lead: RES; Support: LLWM, IMNS,  
Office of the General Counsel (OGC),  
Regions; Resources: 8 Staff-months  
for RES, 3 staff-weeks each for  
LLWM, IMNS, OGC, Regions) April 1991
- iii. Issue final rule  
(Lead: RES; Support: LLWM, IMNS, OGC,  
Regions; Resources: 8 staff-months  
for RES, 3 staff-weeks each for LLWM,  
IMNS, OGC, Regions) April 1992

## c. Review of 1981 Uranium and Thorium Proposed Branch Technical Position (BTP)

There are about 20 sites contaminated with large volumes of soil or tailings containing low levels of source material (uranium and thorium). The staff published a proposed technical position in 1981 to provide guidance on decommissioning of such sites (46 FR 52061). The technical position allows for licensees to stabilize some of the low-level contamination in place, provided that permanent deed restrictions are put on use of the property after the licenses are terminated. Since its publication in 1981, this BTP has not been incorporated into the NRC regulations on decommissioning. As part of its effort to issue up-to-date decontamination criteria, the staff will review the 1981 technical position and modify it to be consistent with the new criteria, incorporate it into the new criteria and regulations, or delete it if appropriate. Option 1 of the BTP will be superseded by the guidance and rulemaking of E.1.a and b.

## The NRC actions will be to --

Estimated Date

- i. Establish a task force to examine  
Options 2, 3, and 4 of the 1981 BTP  
(Lead: LLWM; Support: RES, IMNS,  
OGC; Resources: 4 staff-months for  
IMNS, 1 staff-month for RES, LLWM, OGC) December 1990
- ii. Modify (or delete) the 1981 BTP to be  
consistent with the interim  
decommissioning criteria  
(Lead: IMNS; Support: RES, LLWM,  
OGC; Resources: TBD staff-months) TBD



d. Revision of Regulatory Guide 1.86

In 1989, RES staff prepared a draft revision of Regulatory Guide 1.86. However, it was not been issued for comment, but was held pending issuance of the interim residual contamination criteria. Table 1 of Regulatory Guide 1-86 will be superseded by the guidance and rulemaking of E.1.a and E.1.b.

The NRC actions needed to accomplish this task are -- Estimated Date

- |     |  |                |
|-----|--|----------------|
| i.  | Issue the draft regulatory guide for comment<br>(Lead: RES; Support: NRR, LLWM, OGC;<br>Resources: 2 staff-weeks for RES,<br>1 staff-week each for NRR, LLWM, OGC)                 | September 1990 |
| ii. | Respond to and incorporate comments into final<br>version of regulatory guide for publication<br>(Lead: RES; Support: NRR, LLWM, IMNS,<br>OGC; Resources: <u>TBD</u> staff-months) | TBD            |

2. Previous Disposals of Wastes Under 10 CFR §20.302 and 10 CFR §20.304

Under NRC regulations, licensees may dispose of radioactive wastes on their own property. Before 1981, under 10 CFR 20.304, NRC allowed disposals to be made without prior approval, if the disposals were limited to specifically given nuclide quantities and under specific disposal conditions. Records of these disposals and the location of the burial were required to be kept. On January 28, 1981, 10 CFR 20.304 was revoked. NRC considered that it was inappropriate to continue generic authorization of these burials without regard to such factors as location of the burial, concentrations of radionuclides, the form of the packaging, and prior notification of NRC.

Disposals can still be undertaken by individual licensees, under 10 CFR 20.302. However, an evaluation by NRC is required. This review of proposed burials would result in improved records and would provide greater assurance that buried material will not present a health hazard in the future. To implement disposals under 10 CFR 20.302, NRC issued, in three volumes, NUREG-1101, "Onsite Disposal of Radioactive Waste." This document provides guidance on contents of a licensee application for disposal under 10 CFR 20.302, a method for performing a radiological assessment of the disposals, and an approach for estimating potential groundwater contamination.

Previous disposals undertaken by licensees represent radioactive material that requires evaluation before releasing a site for unrestricted use. Disposals performed under 10 CFR 20.304 have at several sites required exhumation during the decommissioning. In some cases, despite the recordkeeping requirements, records of these disposals are limited or nonexistent. To effectively carry out decommissioning actions at contaminated sites it will be necessary to develop procedures for identifying those sites where previous burials took

place and evaluating the acceptability of those previous burials. Since approval for on-site disposal under 10 CFR 20.302 uses a dose objective of a few mRem, disposals performed under the current requirements are expected to be consistent with the residual contamination requirements under development.

NRC actions needed to develop procedures for evaluating previous disposals are as follows:

- |   | <u>Estimated Date</u> |
|---|-----------------------|
| a. <u>Develop draft procedure</u><br>(Lead: LLWM; Support: IMNS, OGC, NRR, RES; Resources: 2 staff-months for LLWM, 1 staff-week each for IMNS, OGC, NRR, RES)              | September 1990.       |
| b. Submit comments to LLWM<br>(Resources: 1.5 staff-weeks each for IMNS, RES, NRR, OGC)   | December 1990         |
| c. Resolve comments and develop final procedure (Lead: LLWM; Support: IMNS, RES, NRR, OGC; Resources: 2 staff-weeks for LLWM, 0.5 staff-weeks each for IMNS, RES, NRR, OGC) | March 1991            |

### 3. Use of Superfund

In SECY-88-308, "Contaminated Material Licensee Facilities," the NRC staff described 31 materials sites that have a sufficient level of contamination to require special attention from the staff. In SECY-89-224, the NRC staff and OGC recommended that NRC initiate discussions with the U.S. Environmental Protection Agency (EPA), on procedures to make use of Superfund to help resolve decommissioning cases when NRC exhausts its own regulatory options.

In the staff requirements memorandum (SRM) dated January 31, 1990, the Commission rejected the NRC staff's recommendation to pursue discussions with EPA on the development of a protocol governing the application of Superfund to contaminated sites. Instead, the Commission stated, the NRC staff should first consult with the Commission in those cases where Superfund should be considered. At that time, the Commission instructed the NRC staff to submit a detailed discussion of the circumstances at the given site, the reason(s) that existing NRC regulatory authority was inadequate, and the objectives that would be served by the application of Superfund to the site. The discussion would also include an analysis of (1) the cleanup standard that would apply under Superfund and the difference between that standard and the Atomic Energy Act standard; (2) the rights and authorities that the State would have if Superfund were extended to the site; and (3) the rights and authorities that private

citizens would have to sue the Federal government or the licensee(s), using the citizens' suit provision of Superfund.

The SRM dated January 31, 1990, sufficiently resolves the issue of the use of Superfund and sets out the procedures to request action by the Commission. No further NRC staff actions are needed to resolve this issue.

In some cases, sites are listed on the EPA's National Priority List (e.g., the Pesses Co. site) and completion of cleanup would be dependent on Superfund schedules and priorities. NRC's efforts in those cases will be to encourage EPA to consider timely cleanup.

#### 4. Development of a Rule to Require Licensees to List in One Document All Land, Buildings, and Equipment Involved in Licensed Operations

Currently NRC's rules on decommissioning specifically require licensees to keep in one identified location all records important to decommissioning. Such records include drawings of structures and equipment where radioactive materials were used or stored, documentation identifying the location of inaccessible residual contamination, and detailed description of spilled radioactive materials. In addition, such records include identification and characterization of wastes that have been disposed of on-site. Section 3.1 of Regulatory Guide 3.65 (August 1989), issued to support the final decommissioning rule, indicates that facility radiological history information should be submitted to NRC in the decommissioning plan.

In the GAO report, "NRC's Decommissioning Procedures and Criteria Need to Be Strengthened," GAO recommended that in addition to the above, the NRC require licensees to specifically list in one document all land, buildings, and equipment involved with their licensed operations.

At the hearing before the Synar Committee on August 3, 1989, NRC indicated that it agreed with the GAO recommendation and committed to requiring licensees to specifically list in one document all land, buildings, and equipment involved with their licensed operations. In addition, a history of the licensed operations would be included. Subsequent to that hearing, Chairman Carr sent a memorandum to J.M. Taylor, the Executive Director for Operations (EDO), containing action items resulting from the Synar hearing, which included the need for rulemaking on such records.

On September 28, 1989, R.M. Bernero, Director, NMSS, requested that RES proceed with revision of existing rules and draft guides to incorporate the GAO recommendation. In their action plan, RES has identified this activity as "highest priority."

NRC actions needed to complete this action are as follows:

- |   | <u>Estimated Date</u> |
|---|-----------------------|
| a. Rulemaking on recordkeeping  |                       |
| i. As appropriate, initiate the development of a rulemaking on records<br>(Lead: RES; Support: IMNS, OGC, LLWM; Resources: 4 staff-months for RES, 2 staff-weeks each for IMNS, LLWM)   | September 1990        |
| ii. Issue proposed rule for comment<br>(Lead: RES; Support: IMNS, LLWM; Resources: <u>TBD</u> staff-months)   | TBD                   |
| iii. Issue final rule (Lead: RES; Support: IMNS, LLWM; Resources: <u>TBD</u> staff-months)  | TBD                   |
| b. Rulemaking requiring submission of a facility history  |                       |
| i. Initiate rulemaking requiring submission of facility history in response to Synar follow-up issue (Lead: RES; Support: LLWM, IMNS, OGC, and Regions; Resources: 1 staff-month for RES, 0.5 staff-weeks for LLWM, IMNS, OGC, Regions) | September 1990        |
| ii. Publish proposed rule<br>(Lead: RES; Support: LLWM, IMNS, OGC; Resources: <u>TBD</u> staff-months)  | TBD                   |
| iii. Publish final rule<br>(Lead: RES; Support: LLWM, IMNS, OGC; Resources: <u>TBD</u> staff-months)  | TBD                   |
| c. Regulatory guide on recordkeeping  |                       |
| i. Issue draft regulatory guide for comment (Lead: RES; Support: IMNS, LLWM; Resources: <u>TBD</u> staff-months)  | TBD                   |
| ii. Develop final guide (Lead: RES; Support: IMNS, LLWM; Resources: <u>TBD</u> staff-months)  | TBD                   |

## 5. Development of Guidance on the Conduct of Verification Surveys

Currently the NRC's rules on decommissioning indicate that in order for a specific license to be terminated, a radiation survey must have been performed which demonstrates that the premises are suitable for release for unrestricted use.

In the GAO report, "NRC's Decommissioning Procedures and Criteria Need to be Strengthened," GAO recommended that NRC ensure that licensees decontaminate their facilities in accordance with NRC's guidelines before NRC fully or partially releases a site for unrestricted use.

At the hearing before the Synar Committee, NRC indicated that the scope of NRC's confirmatory surveys have been expanded to verify that licensees adequately decontaminate their facilities in accordance with NRC's criteria and that NRC inspectors and agency contractors are specially trained and equipped to perform such verification surveys. (Currently NUREG/CR-2082, "Monitoring for Compliance with Decommissioning Termination Survey Criteria," (June 1981) contain, information on survey design and procedures, related instrumentation, evaluation and interpretation of monitoring data, and verification inspection.)

Nevertheless, at the hearing, NRC indicated that it agreed with the GAO recommendation and that it would revise its existing guidance to clarify the scope and rigor of verification surveys conducted to ensure that licensees decontaminate their facilities in accordance with NRC guidelines before NRC fully or partially releases a site for unrestricted use.

Subsequent to the hearing, Chairman Carr sent a memorandum to J.M. Taylor EDO, containing action items resulting from the Synar hearing, which included the need for guidance on verification surveys. On September 28, 1989, NMSS requested that RES revise existing guidance to clarify the scope and rigor of licensee verification surveys conducted to ensure adequate decontamination.

In its action plan, RES identified this activity as "high priority," but indicated that the effort was "on hold" pending completion of the NUREG report to be published on the scope and rigor of verification surveys. The preparation of this NUREG report has been deferred until resources are available.

In addition, a regulatory guide on instrumentation to be used for license termination surveys is also planned. The preparation of this regulatory guide has also been deferred until resources become available.

NRC actions needed are as follows:

a. Guidance on scope and rigor of licensee verification surveys

	<u>Estimated Date</u>
i. Publish NUREG on licensee verification surveys (Lead: RES; Support: LLWM, IMNS; Resources: <u>TBD</u> staff-months)	Deferred
ii. Develop draft regulatory guide for comment (Lead: RES; Support: LLWM, IMNS; Resources: <u>TBD</u> staff-months)	Deferred
iii. Develop final guide (Lead: RES; Support: LLWM, IMNS; Resources: <u>TBD</u> staff-months)	Deferred

b. Regulatory guide on instrumentation for termination surveys

i. Develop draft guide for comment (Lead: RES; Support: LLWM, IMNS; Resources: <u>TBD</u> staff-months)	Deferred
ii. Develop final guide (Lead: RES; Support: LLWM, IMNS; Resources: <u>TBD</u> staff-months)	Deferred

6. Review of Licensed Sites Terminated after 1965

In the GAO report, "NRC's Decommissioning Procedures and Criteria Need to be Strengthened," GAO recommended that the NRC should ensure that all contamination at a site has been cleaned up so that it is below levels allowed in NRC's guidelines, before releasing all or part of a site for unrestricted use.

In response to this recommendation, in a letter to Senator John Glenn, Chairman of the Committee on Governmental Affairs, dated September 26, 1989, NRC indicated that it would ensure that sites are decontaminated in accordance with NRC's guidance before terminating the license, and also indicated that, if provided adequate resources, NRC planned to review the adequacy of decontamination at sites decommissioned since 1965. In addition, at the hearing before the Synar Committee on August 3, 1989, Chairman Carr committed to request funds, in Fiscal Year 1991, to review the records of sites decommissioned after 1965, to assure that they were adequately decontaminated. This review could identify additional formerly licensed sites requiring further evaluation or remedial action. This study has been budgeted and will begin in

1991. Based on this review, additional sites that need to be added to the SDMP list would be added, as is discussed in Section B of this report. Agreement States will be appraised of the SDMP, as is discussed in Section E.10 below.

NRC actions are:

Estimated Date

- |  |              |
|--|--------------|
| a. Begin study of sites decommissioned since 1965<br>(Lead: IMNS; Support: LLWM)   | October 1990 |
| b. Complete study, including sites needing to be added to list of sites in this report (Lead: IMNS; Support: LLWM; Resources: 11 staff-months for IMNS, 1 Staff-month for LLWM, and \$600K TA contract support in FY91; 33 staff-months for IMNS, 3 staff-months for LLWM, and \$500K TA contract support in FY92; 33 staff-months for IMNS, 3 staff-months for LLWM, and \$100K TA contract support in FY93 and FY94) | April 1992   |

7. Development of a Rule to Require Licensees to Implement More Stringent Future Decommissioning Standards

An EPA Working Group is developing residual contamination criteria for unrestricted release. The product of this group is not expected until the mid-1990's. To have criteria available for terminating licenses in the meantime, NRC is preparing interim residual contamination limits and is planning a rulemaking to formally adopt residual contamination criteria. These NRC actions are discussed in more detail in Section E.1.

In the event that the EPA standards are more restrictive than those adopted by NRC, an important issue requiring resolution will be whether terminated licenses will need to be reevaluated to come into compliance with the new, more restrictive criteria. Until this issue is resolved, licensees may be reluctant to clean up their sites, if future, more restrictive criteria are promulgated at a later time, requiring them to take additional cleanup actions. The Commission discussed this issue in the SRM dated January 31, 1990. In the SRM, the Commission requested that the NRC staff expedite the residual contamination rulemaking activities. The Commission stated that this will provide licensees with an incentive to complete site decommissioning rather than the current situation which may encourage licensees to defer decommissioning pending issuance of NRC requirements. As part of the Federal Register notice for the rulemaking, the Commission requested that the staff provide a general notice to licensees that additional cleanup may be necessary to comply with EPA standards

promulgated in the future. In the interim, before these standards are in place, NRC staff should provide notice that terminated licenses may be recalled and additional cleanup required if forthcoming NRC requirements indicate a need for further decontamination. Once NRC requirements are in place, however, the NRC should not needlessly raise uncertainties at the time of termination about the potential need for licensees to conduct additional decontamination to meet future standards. Unless additional decontamination is shown in the future to be necessary to protect human health and safety and the environment, NRC decisions to terminate licenses are considered final agency actions as long as licensees comply with all applicable standards in effect at the time of termination.

Consistent with this guidance, the Commission directed the NRC staff not to develop procedures to provide notice to licensees that licenses terminated in accordance with NRC requirements may be recalled if forthcoming EPA regulations indicate a need for further decontamination. In the event the EPA should develop residual radioactivity standards, the NRC staff should emphasize to EPA the need to grandfather those sites whose licenses have already been terminated in accordance with NRC requirements prior to issuance of such standards or to demonstrate that its (EPA's) standards result in significant and justifiable improvement in protecting human health and the environment.

In response to this guidance the NRC staff will --

Estimated Date

- a. Include a general notice in the residual contamination proposed rulemaking (Lead: RES; Support: OGC, LLWM, IMNS, Regions; Resources: 1 staff-month for RES, 1 staff-week each for OGC, LLWM, IMNS, Regions)

April 1990

8. Review and Modification, if Needed, of License Termination Procedures

The new decommissioning rule modifies the license termination procedures used by licensees and the NRC staff. Therefore, the procedures in effect now will need to be updated to reflect the new regulatory requirements. To provide guidance to licensees and the NRC staff on terminating licenses, the NRC staff plans to issue a regulatory guide on the procedural method for license termination for Parts 30, 40, and 70 licenses. This regulatory guide would be the NMSS equivalent of Regulatory Guide 1.86. Residual contamination criteria for license termination are treated in the rulemaking and regulatory guide being developed in E.1.a and b above.

The NRC actions will be to --

Estimated Date

- a. Initiate the development of a regulatory guide for terminating Parts 30, 40, and 70 licenses

June 1991



(Lead: RES; Support: IMNS,  
LLWM, OGC, Regions; Resources: 2  
staff-months for RES, 1 staff-week  
each for IMNS, LLWM, OGC, Regions)

- b. Issue draft regulatory guide March 1992  
for comment (Lead: RES; Support:  
IMNS, LLWM, OGC, Regions; Resources: 4  
staff-months for RES, 2 staff-weeks  
each for IMNS, LLWM, OGC, Regions)
- c. Issue final regulatory guide December 1992  
(Lead: RES; Support: IMNS,  
LLWM, OGC; Resources: 4 staff-  
months for RES, 2 staff-weeks each  
for IMNS, LLWM, OGC, Regions)

9. Development of Procedures for Follow-up at and Removal of Unlicensed Facilities from the SDMP List

The GAO cited several cases in their report entitled, "NRC's Decommissioning Procedures and Criteria Need to be Strengthened," where license terminations were not performed in accordance with the Atomic Energy Commission (AEC) and present-day NRC requirements. To ensure that future license terminations will meet NRC requirements, the NRC staff will develop procedures to ensure that appropriate decommissioning planning, inspections, recordkeeping, and surveys are conducted. NRC actions related to recordkeeping are addressed under Section E.4 and actions related to surveys are addressed under Section E.5.

The NRC actions will be as follows:

Estimated Date

- a. **Materials licensee decommissioning plan  
standard review plan (SRP)**
  - i. **Develop draft SRP (Lead:** September 1990  
**LLWM; Support: IMNS, Regions;**  
**Resources: 2 staff-months for**  
**LLWM, 2 staff-weeks each for IMNS,**  
**Regions)**
  - ii. **Develop final SRP (Lead:** March 1991  
**LLWM; Support: IMNS, Regions;**  
**Resources: 1.5 staff-months for**  
**LLWM, 1 staff-week each for IMNS,**  
**Regions)**
- b. Development of decommissioning inspection procedures

- i. ~~Develop draft inspection procedures in Manual Chapter 2800~~ December 1990  
 (Lead: LLWM; Support: IMNS, Regions;  
 Resources: 2 staff-months for  
 LLWM, 2 staff-weeks each for  
 IMNS, Regions)
- ii. ~~Develop final inspection procedures in Manual Chapter 2800~~ July 1990  
 (Lead: LLWM; Support: IMNS, Regions;  
 Resources: 2 staff-months  
 for LLWM, 2 staff-weeks each  
 for IMNS, Regions)

10. Coordination with Agreement States on SDMP activities.

The NRC staff identified 39 materials licensee sites that require cleanup. In addition to these sites, there are also other materials licensee sites requiring cleanup that are regulated under the Agreement States program. Actions taken on both the NRC and Agreement State licensed sites should ultimately be consistent and compatible. On December 22, 1989, NRC requested Agreement States to identify materials sites requiring cleanup. As of January 31, 1990, all the States had responded and identified 105 sites.

The State Programs staff, of the Office of Governmental and Public Affairs, intends to continue to monitor Agreement State decontamination and decommissioning activities, to coordinate Agreement State technical assistance requests, and to transmit copies of related NRC staff documents to the Agreement States, to ensure that decommissioning activities are performed in a consistent manner.

11. Consideration of a "Reopener" Clause to Require Additional Decontamination

Section E.7 discusses the issue of requiring licensees to implement more stringent residual contamination standards that may be promulgated by NRC in the future. In an SRM dated January 31, 1990, the Commission requested the NRC staff expedite the residual contamination rulemaking and, as part of that rulemaking, provide a general notice to licensees that additional cleanup may be needed to comply with future NRC standards. The Commission also instructed the NRC staff not to develop procedures providing notice to licensees that licenses terminated in accordance with NRC requirements may be recalled if the termination criteria are ultimately less restrictive than future EPA standards. Instead the NRC staff should emphasize to EPA the need to grandfather those sites whose licenses have already been terminated in accordance with NRC regulations, unless the EPA standards result in a significant and justifiable

improvement in protecting human health and safety. The grandfathering of sites decommissioned in accordance with forthcoming NRC residual contamination regulations should be addressed in a future rulemaking so that litigation in prior license terminations is minimized. This rulemaking will be rolled into the residual contamination criteria rulemaking discussed in Section E.1.b. The content of this rulemaking will be limited to the grandfathering of NRC requirements as an NRC rulemaking cannot limit EPA enforcement actions if EPA promulgates more restrictive requirements in the future.

## 12. Review of Test and Research Reactor License Terminations

Appendix B lists the status of all decommissioned reactors. AEC and NRC terminated the licenses of 54 critical assemblies and test and research reactors. There are also four experimental reactors now under DOE control. NRC staff will review the non-DOE facilities to ensure that no contamination above the NRC requirements still remains at these sites. Any sites that require cleanup will be added to the contaminated site list for tracking.

The NRC actions will be to --

### Estimated Date

- a. Review the license termination files and survey data to determine if former reactor sites meet the new NRC residual contamination criteria (Lead: LLWM; Support: NRR; Resources: 3 staff-months for LLWM, 1 staff-month for NRR)
- b. Identify reactor sites not meeting criteria, add to contaminated site list, and develop action plan (Lead: LLWM; Support: NRR; Resources: 1.5 staff-months each for LLWM, NRR)

December 1990

March 1991

## F. Issues Requiring Resolution To Minimize Future Contaminated Site Problems

There are some policy issues that need to be resolved in order to minimize or better administer future contaminated site problems. One major area that has been addressed and should minimize future contaminated site problems is inclusion in the decommissioning rule of financial assurance requirements for material facilities applicants and licensees (53 FR 24018). These requirements include cost amounts and funding methods for different categories of licensees. The decommissioning rule also includes procedures for decommissioning and license termination that should minimize future contaminated sites.

However, three areas that need to be addressed at this time are:

1. Timeliness of cleanup rulemaking
2. Commission policy statement on license continuance or renewal when a licensee is unable to demonstrate adequate assurance of ability to decontaminate or decommission
3. Development of administrative procedures for handling newly identified problem sites

In this section, the forementioned issues are discussed and a plan, including schedules, for resolving the issues, is presented. An estimate of the resources is also provided.

### 1. Timeliness of Cleanup Rulemaking

As noted previously, the decommissioning rule includes procedures for decommissioning and license termination. However, as discussed in SECY-89-369, the regulations allow licensees discretion as to the timing of decontamination and decommissioning activities. This has allowed some licensees to remain inactive without decommissioning, or to maintain inactive portions of contaminated facilities. Even when all licensed operations are permanently terminated, the regulations do not provide definitive requirements as to how soon final decommissioning plans must be developed, submitted, approved, or how soon decommissioning must be accomplished. Under these circumstances, NRC will likely encounter litigative vulnerability each time it issues an order to undertake or complete decommissioning.

The memorandum from S.J. Chilk, SECY, to J.M. Taylor, EDO, 1/29/90, instructed the staff to establish a timeliness criterion (e.g., 3 years) for the completion of decontamination and cleanup activities after cessation of operations, and discussed certain variances to the requirement. The memorandum stated that as a first step, the staff should submit a plan for promulgating a timeliness criterion. NMSS has requested that RES proceed with rulemaking in this area. In its action plan, RES identified this activity as "highest priority."

NRC actions needed are as follows:

Estimated Date

- |   |            |
|---|------------|
| a. Develop a plan for initiating rulemaking (Lead: RES; Support: IMNS, LLWM, OGC, Regions; Resources: 2 staff-months for RES, 1 staff-week each for IMNS, LLWM, OGC, Regions) | April 1990 |
| b. Issue proposed rule for comment (Lead: RES; Support: IMNS, LLWM, OGC, Regions; Resources: 7 staff-months for RES, 3 staff-weeks each for IMNS, LLWM, OGC, Regions)         | April 1991 |
| c. Issue final rule (Lead: RES; Support: IMNS, LLWM, OGC, Regions; Resources: 7 staff-months for RES, 3 staff-weeks for IMNS, LLWM, OGC, Regions)                             | April 1992 |

2. Development of Enforcement Guidance for Decommissioning Financial Assurance Requirements

The financial assurance requirements for decommissioning, promulgated in the June 27, 1988, decommissioning rule, go into effect on July 27, 1990. It is likely that some licensees will be found in noncompliance with these new regulations. Some of these licensees may be in noncompliance because (1) they are unaware of the requirements, (2) they are making final arrangements to obtain a financial assurance mechanism, (3) they are unable to obtain a financial assurance mechanism, or (4) they refuse to obtain a financial assurance mechanism. To ensure a consistent enforcement approach is taken by the agency in dealing with these noncompliances, the NRC staff will prepare enforcement guidance addressing these issues.

The NRC actions will be to --

Estimated Date

- |   |            |
|---|------------|
| a. Prepare NMSS position on exemptions (Lead: LLWM; Support: Office of Enforcement (OE), IMNS, Regions, OGC; Resources: 2 staff-months for LLWM, 1 staff-week for OE, IMNS, OGC, Regions) | April 1990 |
|---|------------|

- b. Prepare enforcement guidance  
(Lead: OE; Support: LLWM,  
IMNS, OGC, Regions; Resources:  
1 staff-month for OE, 1 staff-week  
for LLWM, IMNS, OGC, Regions)

June 1990

3. Development of Administrative Procedures for Handling Newly Identified Problem Sites

The listing of sites in Sections C, D, and G of this report have set out the current list of contaminated sites which need to be addressed by the NRC staff.

To assist in the updating of this report, Tables 1, 3, and 4 will be maintained by cognizant staff in NMSS and the regional offices. As progress is made toward completion of decommissioning or characterization activities, staff will mark on those tables and send them on a quarterly basis to NMSS/LLWM. NMSS/LLWM will update the changes on a master copy to be updated annually. In addition, if new sites are identified which should be added to the list, Tables 1, 3 and 4 will be updated to include those sites.

## 6. Contaminated Sites Activity Schedules

### 1. Schedule Information

This section discusses the details of the schedules of the steps involved in site cleanup. Section 6 of Appendix A contains a detailed discussion of the status of decontamination activities and the steps in the cleanup which have been completed to date. Section 7 of Appendix A contains a detailed discussion of the actions still needed to complete cleanup and the dates where known. Section 7 of Appendix A also contains a description of the next step in the site cleanup.

Table 3 summarizes the information in Sections 6 and 7 of Appendix A and lists each site alphabetically under the appropriate prioritization level that it belongs to (see Section D.2 for a discussion of the prioritization levels). Table 3 also includes potential problem areas which may inhibit site cleanup.

Table 3 contains schedule information for the following cleanup steps:

1. Site and/or facility characterization - including preparation of the site characterization plan and performance of site characterization;
2. Submittal of the decontamination or decommissioning plan;
3. The status of NRC's review of the plan;
4. Whether the plan has been approved;
5. The decontamination or decommissioning activities that are in progress;
6. The status of the final site survey, including NRC's confirmatory survey;
7. The anticipated timing for license termination.

### 2. Major Activities Estimated to be Completed in 1990

Based on the current schedule estimates, it is anticipated that the following major actions will be completed in 1990: 1) decontamination plans or site characterizations for 11 sites will be submitted; 2) NRC will complete its review of decontamination plans for 7 sites; 3) a confirmatory survey for the complete site or significant portion of the site will be completed at 5 sites; and 4) the license will be terminated at 3 sites resulting in removal of those sites from the SDMP list (Chemetron, UNC Wood River Junction, and Amax).

*Survey  
PR Zimmerman done  
Chemetron  
Shield Hall ready for survey*

## H. Resources

This section contains a very preliminary estimate of the resources necessary for the SDMP. These resource estimates are based on Section B of this report which describes the SDMP project management plan, and on Sections E and F, which describe the policy issues to be addressed.

The resource estimates for the SDMP project management plan are separated into two parts: 1) resources for Overall Program Management, as described in Section B.1.a, and 2) resources for Specific Site Project Management, as described in Section B.1.b. Resource estimates for Specific Site Project Management are based on NRC actions needed for each site described in Appendix A and in Table 3.

Resource estimates for resolution of policy issues are based on the discussion of each policy issue discussed in Sections E and F.

The total resources needed to implement the proposed SDMP (in staff-years) are summarized in Table 4, for the principal activities of: 1) Overall Program Management, 2) Specific Site Project Management, and 3) Resolution of Policy Issues. Table 4 lists the resources for each NRC organization involved. This Table does not include resources needed to review the decommissioning of reactor facilities contained in Appendix B.

In the FY1991 budget request (Office of Management and Budget (OMB) mark) dated January 12, 1990, the only resources budgeted for materials licensee decontamination and decommissioning activities are to --

1. Stabilize source material sites; 2 Full Time Equivalent (FTE) unit levels of effort for FY90, FY91, and FY92.
2. Review materials licenses terminated since 1965; 1 FTE and \$600K in FY91 and 2 FTE and \$500K in FY92.

All other decontamination and decommissioning activities are unbudgeted. Therefore, the resources (in FTE) needed to implement the SDMP (assuming no significant hearings are required) that would need to be reprogrammed are as follows: for 1990 - NMSS, 2.8; Regions, 4.5; RES, 1.8; OGC, 1.8; for 1991 - NMSS, 5.0; Regions, 7.1; RES, 2.1; OGC, 1.3. NRR resources are comparatively small. Resource for FY-1992 will be addressed in the NRC Five Year Plan and in ongoing budget development efforts.



Table 1 Site Identification Summary

Site Identification	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
<b>Level A Sites</b>			
Allied Signal Teterboro, NJ 040-00772	Site used for Mg and Th production in the 50's and 60's	1) 15 - 20 55-gal drums contain- ing 480 pCi/g Th in bank of drainage ditch; some of the drums are leaking material; 2) soil contaminated with Th & Ra-226; Ra-226 (300-2500 pCi/g) may be the major contaminant in areas other than the ditch	No immediate threat; material in drums & soil not accessible to the public & does not appear to be moving though near drainage ditch; as an interim measure, drum area will be stabilized shortly
Chemetron Cleveland, Ohio 040-08724	HARVARD AVE - Inactive producer of DU; all U removed from site & decon begun in 1978; BERT AVE - dump site for DU; city wants to build storm sewer onsite / LICENSEE IN CHAP 11 BANKRUPTCY, BUT HAS COMMITTED TO CLEANUP	1) HARVARD AVE - 2 acres of soil contaminated with DU; 2) BERT AVE - soil contaminated with U-238 (<0.5-170 pCi/g), Th-232 (<0.1-3.5 pCi/g), Ra-226 (0.3-1973 pCi/g)	No immediate threat; Harvard Ave decon is 90% complete & site access is controlled; Bert Ave is fenced off & patrolled daily
Gulf Pawling, NY (No Docket) License Term- inated 1975)	Former Pu fuel lab & critical reactor assembly building/ LICENSEE NO LONGER IN BUSINESS; U.S. NATIONAL PARK SERVICE IS NOW SITE OWNER	1) Some Pu contamination in Pu fuel lab; 2) some soil contamination outside lab (limited to tens of cubic feet)	No immediate threat; small areas of contamination; site is under National Park Service control
Kerr-McGee (Cimarron) Crescent, Okla 070-01193	Inactive Pu and U fuel fab plants (closed in 1975)	1) A few 100,000 cu. ft. of soil contamination (around buildings, settling ponds, & burial ground) with U at 30-100 pCi/g; 2) some U contamination in U fab plant; 3) small amount of Th contamination in soil	No immediate threat; low solubility U in fairly low concentrations in soil
Kerr-McGee Cushing, Okla (No Docket, License Terminated)	Processed U & Th onsite from 1962-66; terminated license in 1966; further site clean- up from 1972-1982	1) Around buildings - some patches of soil & building contamination of Th-232, Ra-226, & U-238 > 10 pCi/g; 2) Sludge pits - hazardous waste & radwaste at concentrations up to 90 pCi/g Th-232, 80 pCi/g Ra-226, and 18 pCi/g U-238	No immediate threat from radiation; however site is proposed for EPA's NPL for Uncontrolled Hazardous Waste Sites

Table 1 Site Identification Summary

Site Identification	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
Level A Sites			
Kerr-McGee West Chi- cago, Ill 040-02061	Former Th & rare earth processor (closed in 1973); site includes processing buildings and disposal site with Th ore residues and other processing wastes	1) 1400 cu. meters of building & equipment rubble; 2) 170,000 cu. meters of contam- inated soil; 3) 55,000 cu. meters of tail- ings sludge and pond sediments	No immediate threat; access to site is controlled; tailings pile covered with dirt to keep radiation levels down; air monitors at perimeter of disposal site
Safety Light Blooms- burg, Pa 030-05980	Operated by U.S. Radium (USR) using various isotopes since 1940's including Ra, Sr, Cs, and H-3 / USR & SAFETY LIGHT CLAIM TO BE INCAPABLE OF FUND- ING DECON OF SITE; AN NRC ORDER TO SET ASIDE FUNDS FOR SITE CHARACTERIZATION HAS BEEN PARTIALLY STAYED BY ASLB AND ASLAB	Buildings, soil, and ground- water contaminated with Sr-90, Cs-137, Ra-226, and other nuclides; no estimate of volume of waste	Although, to date, the known contam- ination at the site has not been shown to be causing adverse effects on public health and safety, there is an immediate need to determine the location, concentration, and movement of the contamination on the site. There is apparent migration of radionuclides in groundwater off- site, but measurements of off-site wells over the last 2 years have not exceeded EPA drinking water standards. However, there is no systematic monitoring of off-site groundwater to ensure EPA drinking water standards are met.
Texas Instruments Attleboro, Mass 070-00033	Fuel producer (1957-1983); currently inactive	Soil contaminated with at least 30 mCi of buried U	No immediate threat due to soil cap on the disposal area & the small amount of material remaining onsite
UNC Recovery Wood River Jctn. RI 070-00820	Inactive U scrap recovery (1964-1980); site contains buildings, lagoons, old burial ground	1) Enriched U & fission prod- ucts in buildings and in soil; 2) some groundwater contam- ination (Sr-90, 12 pCi/l)	No immediate threat; remediation activities complete

Table 1 Site Identification Summary

Site Identi- fication	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
Level A Sites			
West Lake Landfill St. Louis, Mo. 040-08801	Uranium ore processor 1943- 46; unregulated landfill on site 1962-74; contaminated soil placed in landfill 1973/ COTTER CORP. BEING HELD AS RESPONSIBLE BUT HAS NOT YET INDICATED WILLINGNESS TO CLEAN UP SITE	1) 3.5 million cu. ft. of soil contamination with >5 pCi/g Ra-226 2) 0.5 million cu. ft. of soil contamination with Ra-226 at avg. concentration of 90 pCi/g, much smaller quantities of U, and 1800-9000 pCi/g of Th-230	No immediate threat; site con- trolled by property owner; ground- water monitoring wells onsite show radioactivity levels slight- ly above background; ingrowth of Ra-226 is increasing the radiological hazard

Table 1 Site Identification Summary

Site Identification	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
Level B Sites			
Amax Wood Cty, WV 040-08820	Engineered cell containing Th & U is on 15 acres surrounded by security fence	1) 100,000 lbs of Th & U in soil & rubble; 2) cell contains pyrophoric material that will slowly oxide to ZrO	No immediate threat; waste contains low concentration of natural Th & U and is confined in an engineered cell; well monitoring shows no sign of nuclide leakage
B & W Appollo, Pa 070-00135	Active radioanalytic labs; former U fab plant that discontinued operations in 1980	1) Some U contamination in U fab plant including kg's of high enriched U 2) U soil contamination around plant, at adjacent site, in sewer, & at river bank: about 2E+5 cu. ft of contaminated soil @ avg concentration of 100 pCi/g	No immediate threat, low solubility U in low concentration in soil; facility under licensee control
BP Chemicals Lima, Ohio 040-07604	Active petrochemical plant	1) 200 55-gal drums with >35 pCi/g of DU in sand; 2) 4 ponds with 4.8E5 cu. ft. liquids & 4.9E5 cu.ft. of solid hazardous waste; 3) 2 bldgs, 5 chemical reactors, equipment, and adjacent soil contaminated	No immediate threat; industrial site with controlled access
Cabot Corp Revere, Reading, Pa 040-06940	REVERE - Inactive ore processor; U & Th in ore and slags; READING - Rare earth processor from 1967 to 1969; U & Th in ore and slags have been stored onsite since then	REVERE - trace quantities of natural U and Th READING - 1) 600 tons of slag with 0.16% Th & 0.04% U were dumped on slope of embankment on edge of site; 2) trace quantities of U & Th in building	REVERE - no immediate threat; licensee says site is decontaminated; READING - no immediate threat; U & Th are in insoluble slag; groundwater is sampled and erosion is monitored
Dow Midland, Mich 040-00017	Inactive manufacturer of Th-Mg alloys; several slag piles onsite	52000 cu. yds. of contaminated soil & slag at Bay City and Midland sites; about 3.5 Ci of Th-232 @ Bay City and 0.69 Ci of Th-232 @ Midland	No immediate threat; material consists of Th-Mg alloy slag which is insoluble

**Table 1      Site Identification Summary**

<b>Site Identi- fication</b>	<b>Site Description/ Problems With Viable Responsible Organization</b>	<b>Waste and Activity Remaining Onsite</b>	<b>Radiologic Hazard</b>
<b>Level B Sites</b>			
<b>GSA Watertown, Mass (No Docket)</b>	<b>Former Manhattan District Site where work with radio- active matls was performed by AEC, Dept of Army, and others</b>	<b>1) Soil contamination with U at avg. concentration of 240 pCi/g, with high readings of 26000 pCi/g; volume of waste about 8 to 12 cu. meters; 2) unestimated quantity of contaminated concrete</b>	<b>No immediate threat due to small amount of U onsite; migration to groundwater is small; site is access controlled</b>
<b>Heritage Minerals Flemington, NJ (Not Yet Licensed)</b>	<b>Rare earth processor; monazite sand in feed contains Th and U; during processing, Th and U in monazite are concentrated &amp; go to tailings pile</b>	<b>Contaminated tailings contain Th + U at concentration of 0.585%; feed contains Th + U concentration of 0.074% - both are in excess of quantities requiring an NRC license</b>	<b>No immediate threat; source material does not become air- borne; groundwater sampling showed no contamination</b>
<b>Kawkawlin Landfill Bay City, Mich (No Docket)</b>	<b>Th waste in cell with RCRA wastes on Michigan &amp; SCA property; small amount of Th on Hartley property (former commercial landfill) / NO LICENSEE; NO SPECIFIC FUND- ING AGREED TO BY AFFECTED PARTIES</b>	<b>Insoluble Th - Mg slag in the land- fill; total volume &amp; activity not well characterized; soil samples show up to 96 pCi/g of Th-232 &amp; 64 pCi/g of Th-228 (one small area of 561 &amp; 527 pCi/g)</b>	<b>No immediate threat; access to areas is controlled; Th is in insoluble form; monitor- ing program shows Th levels to be well below EPA drink- ing water standards</b>
<b>Magnesium Elektron Lakehurst, NJ (No Docket, Not Yet Licensed)</b>	<b>Rare earth processor; Zircon in feed contains U &amp; Th; during processing Th &amp; U in feed are concentrated and go as sludge to containment lagoon</b>	<b>Contaminated tailings contain Th + U concentration of 0.37%; feed has Th + U concentration of 0.05% - both of these are in excess of quantities requiring NRC license</b>	<b>No immediate threat; exposure levels are low due to low levels of U &amp; Th; does not become airborne</b>
<b>Molycorp Washington, Pa 040-08778</b>	<b>Shutdown rare earth process- or; possesses a storage-only license/LICENSEE NOT INCLINED TO UNDERTAKE NEEDED CLEANUP PER NRC SPECIFICATIONS</b>	<b>Th spread over most of site in soil, holding ponds, &amp; slag pile with concentrations up to 10 to 1000 pCi/g</b>	<b>No immediate threat; fairly low Th concentration</b>

Table 1 Site Identification Summary

Site Identification	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
<b>Level B Sites</b>			
Molycorp York, Pa 040-08794	Rare earth processor; U & Th in waste was packed in 55 gal drums & stored onsite; most drums have been shipped away	Soil contamination with concentration of Th exceeding 250 pCi/g; most of Th is in a mound on the property	No immediate threat; only contamination is Th in soil & buildings and a few drums left onsite
Pesses Pulaski, Pa 040-08406	An abandoned metal reclaiming facility; contamination on site was stabilized under EPA Superfund action / LICENSEE IS BANKRUPT AND HAS ABANDONED FACILITY	1) 1500 drums of mixed wastes containing Mg-Th; 2) 500 cu. yds. of soil contaminated with Th; 3) 800 cu. yds. of hazardous waste (Cr, Pb, Cd)	No immediate threat as stabilization has occurred; access controlled by fence & security; sampling shows no migration to groundwater
Process Technology Rockaway, NJ 030-07022	Active irradiator	1) 2 areas of soil contaminated by Co-60, (amount of contaminated soil not yet estimated); 2) some contaminated debris	No immediate threat; previously discovered buried drums have been removed; external & airborne exposure is low
Schott Glass Duryea, Pa 040-07924	Production of Th glass ended in 1980; scrap material containing Th placed in landfill on the site	1) 10,000 cu. yds. of soil contaminated with Th @ avg of 2 pCi/g; 2) Th in glass scrap in landfill onsite is 4710 pCi/g	No immediate threat; concentration of Th in soil is less than limits of Option 1 of NRC BTP on Th/U disposal (46 FR 52061); Th in glass scrap is greater than BTP levels but is unlikely to migrate
Shield- alloy Cambridge, Ohio 040-08948	Inactive rare earth processor; Th & U from the process are in waste slag & are stored in 2 piles onsite	Th & U are in 2 slag piles onsite: 1) 300,000 tons on 8 acres (conc. of Th-232, U-238, Ra-226 is 2, 2.5, and 3 pCi/g, respectively); 2) 90,000 tons on 2.6 acres (conc. of Th-232, U-238, & Ra-226 is 4, 21, and 66 pCi/g, respectively)	No immediate threat; Th and U in slag material are in insoluble form

**Table 1 Site Identification Summary**

Site Identi- fication	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
<b>Level B SITES</b>			
Westinghouse (Waltz Mill) Madison, Pa 070-00698	Inactive defueled test reactor; active nuclear ser- vice operation with lab fac- ilities using byproduct, source, and special nuclear material	1) Groundwater contamination with Sr-90 (up to 2900 pCi/l); 2) Large amount of contamination in liquid waste retention basin	No immediate threat; licensee is treating groundwater & is stabilizing retention basin, which is lowering groundwater concentration; access to site is controlled

Table 1 Site Identification Summary

Site Identification	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
<b>Level C Sites</b>			
Advanced Medical Cleveland, Ohio 030-16055	Active manufacturer of Co-60 sources; liquid waste holdup room is sealed for decay until decommissioning; license renewed in December 1989	Contamination is from Co-60 operations; general area contamination in liquid holdup tank room	No immediate threat; waste holdup tank is shielded and access is prohibited by a concrete block wall
Army, Dept of Aberdeen, Md 040-06394	Active munitions firing range; little ground- water info available but USGS has started major investigation on status of geology & groundwater	Approx. 70000 kg of fired DU rounds (whole or fragments) in target area; smaller frag- ments would be hard to sep- arate from soil	No immediate threat; access to site is controlled; past studies indicated little movement of DU in this environment
B & W Parks Township, Pa 070-00364	Active nuclear service oper- ation; Pu and U fuel fab operations ended in 1980	1) Pu & U contamination in Pu fab & U fab plants; 2) U & Th in con- taminated soil in disposal area onsite (kg amounts of U & Th in a few hundred thousand cu. ft. at concentration of <30 pCi/gm)	No immediate threat; facility under licensee control; low solubility U and Th
Budd Co. Phila, Pa 030-19963	Former hot cell operation shut down in 1967; hot cell is sealed shut & is re- stricted area; rest of building is unrestricted	As of Aug, 1988, about 0.3 Ci of Co-60 remain in hot cell; volume of contaminated material is not known	No immediate threat; radio- active material is sealed in a licensed hot cell; annual leak test of hot cell is required
Fansteel Muskogee, Okla 040-07580	Tantalum and columbian processor; extraction activities have ceased; U & Th in feed material remain in process waste residues	25 tons and 65 tons of U/Th waste in 2 sludge ponds re- spectively (the ponds are no longer receiving wastes)	No immediate threat; form of contamination is low solubility natural U & Th
Mallin- ckrodt St Louis, Mo 040-06563	Rare earth processor; operations are in standby status	Small quantities of Th waste in buildings	No immediate threat; property is controlled by licensee and contamination is in bldg



Table 1 Site Identification Summary

Site Identification	Site Description/ Problems With Viable Responsible Organization	Waste and Activity Remaining Onsite	Radiologic Hazard
<b>Level C Sites</b>			
Nuclear Metals Concord, Mass 040-00672	Active manufacturer of products from depleted uranium (DU)	About 250,000 lbs. of DU in holding basin; DU was sent to the basin during the period 1958 to 1985	No immediate threat; access to basin is controlled; results of recent groundwater monitoring give no evidence of migration of DU
Perma- grain Karthaus, Pa 030-13573	Active Co-60 irradiator; 6 hot cells onsite; site previously run by various companies; site is owned by State of Pennsylvania	Contamination in inactive facilities (storage tanks, hot cells, drainage system) is less than 15 mCi of Sr-90; volume of waste is not known	No immediate threat; no public access to facility; monitoring by Pennsylvania does not show any migration of materials to groundwater
Remington Arms/US Army Independence, Mo 040-08767	Firing ranges contaminated with depleted uranium (DU) fragments, lead, and unexploded ordnance; government owns property	1) 7655 lbs (1530 mCi) of DU fragments on firing range; 2) Sand storage pile contam- inated with DU	No immediate threat; site access is controlled by 24-hr security guards; DU is in solid form and should not readily migrate; groundwater sampling by the licensee has shown no contamination
Shield- alloy Newfield, NJ 040-07102	Rare earth processor; smelting operations in foundry; Th & U wastes in 2 slag piles	Th & U are in 2 slag piles onsite: 1) Pile 1 - avg pCi/g of Th-232, U-238, Ra-226 of 366, 105, 69; 2) Pile 2 - avg pCi/g of Th-232, U-238, Ra-226, of 516, 202, 123; Also 1) soil around piles contam- inated with Th, U, & Ra; 2) soil contamination in yard and buildings of an unknown amount	No immediate threat; Th and U in slag piles are in insoluble form and are in low levels in soil
Whittaker Greenville, Pa 040-07455	Inactive rare earth processor (ended operations in 1974); contaminated slag at several places onsite, with large amount near Shenango River	Approximately 1 million cu. ft. of slag with Th & U concentrations ranging from below detectable levels to 6800 pCi/g Th	No immediate threat; ground- water sampling since 1974 has not shown any significant offsite migration of nuclides

Table 2 Order of Priority of NRC Review of Contaminated Sites

Site Identi- fication	Timeliness of Action Needed	Status of Cleanup	Responsible Organization	Congressional Commitment	Total	Priority	Notes
Allied Signal, NJ 040-00772	2	2			4	A	Leaking drums in drainage ditch; drum stabilization plan submitted and approved
Chemetron 040-08724	2	2	2		6	A	Licensee in Chap. 11 bank- ruptcy; cleanup in pro- gress; possible need for deed restrictions on site
Gulf Pawling (No Docket)	2		2	1	5	A	Licensee no longer in bus- iness; site in National Park area; Synar hearing 8/89
Kerr-McGee (Cimarron) 070-01193		2		1	3	A	Decon of bldgs in progress; Synar hearing 8/89
Kerr-McGee Cushing (No Docket)		2	2	1	5	A	Decon plan; Synar hearing 8/89; license previously terminated
Kerr-McGee West Chicago 040-02061	2	2			4	A	Contamination in resident- ial areas; decon in pro- gress
Safety Light 030-05980	2		2		4	A	Safety Light, USR, and re- lated corporations claim to be not capable of funding decomm; ASLB & ASLAB par- tially stayed NRC decon order; contamination by Sr- 90 & Cs-137 in groundwater
Texas Instruments Attleboro 070-00033		2		1	3	A	Decon and site survey complete; GAO report
UNC Wood River Junction 070-00820	2	2			4	A	Decon complete; some groundwater contamination

Table 2 Order of Priority of NRC Review of Contaminated Sites

Site Identi- fication	Timeliness of Action Needed	Status of Cleanup	Responsible Organization	Congressional Commitment	Total	Priority	Notes
West Lake Landfill 040-08801	2		2	1	5	A	Responsible organization has not indicated willing- ness to decon; ingrowth of Ra-226 increasing hazard; Synar hearing 8/89
Amax 040-08820		2			2	B	Contaminated soil in en- gineered cell; Amax trans- ferring site to DOE
B & W Appollo 070-00135	2				2	B	Uranium contamination in sewer and at river bank
BP Chem- icals 040-07604		2			2	B	Decon plan due 5/90
Cabot Corp Revere, Reading 040-06940		2			2	B	Decon complete; confirma- tory survey pending
Dow 040-00017		2			2	B	Application for disposal of wastes submitted 10/89
GSA Watertown (No Docket)		2			2	B	Decontamination in progress
Heritage Minerals (Not Yet Licensed)		2			2	B	License application to address unlicensed source material submitted
Kawkawlin Landfill (No Docket)			2		2	B	No licensees; no specific funding arrangement agreed to by affected parties; Dow may fund cleanup
Magnesium Elektron (No Docket)		2			2	B	License application to address unlicensed source material submitted, 1989

Table 2 Order of Priority of NRC Review of Contaminated Sites

Site Identi- fication	Timeliness of Action Needed	Status of Cleanup	Responsible Organization	Congressional Commitment	Total	Priority	Notes
Molycorp Wash, Pa 040-08778			2		2	B	Licensee probably able but not inclined to undertake needed cleanup per NRC specifications
Molycorp York, Pa 040-08794		2			2	B	Decon plan being revised
Pesses 040-08406			2		2	B	Licensee bankrupt and abandoned site; site stabilized under Superfund
Process Technology 030-07022		2			2	B	Site characterization plan and decon plan under NRC review
Schott Glass 040-07924		2			2	B	Decon plan submitted and partially accepted; licensee response to NRC questions pending
Shield- alloy Cambridge 040-08948		2			2	B	Decon of portion of site complete; decon plan for remainder of site due Spring 1990
Westinghouse (Waltz Mill) 070-00698	2				2	B	Sr-90 contamination in groundwater but treatment appears to be lowering concentrations
Advanced Medical 030-16055					0	C	
Army, Dept of 040-06394					0	C	

Table 2 Order of Priority of NRC Review of Contaminated Sites

Site Identi- fication	Timeliness of Action Needed	Status of Cleanup	Responsible Organization	Congressional Commitment	Total	Priority	Notes
B & W Parks Township 070-00364					0	C	
Budd Co. 030-19963					0	C	
Cabot Corp Boyertown 040-06940					0	C	
Fansteel 040-07580					0	C	
Mallin- ckrodt 040-06563					0	C	
Nuclear Metals 040-00672					0	C	
Perma- grain 030-13573					0	C	
Remington Arms/US Army 040-08767					0	C	
Shield- alloy Newfield 040-07102					0	C	
Whittaker 040-07455					0	C	

Table 3 Site Decontamination Management Program Schedule

Site Identification	Site/Facility Characterization	Submittal of Decon/Decon Plan	Status of NRC Review of Plan	Decon/Decon Plan Approved	Decon/Decon in Progress	Final Site Survey	Terminate License	Problems
<b>Level A Sites</b>								
Alfred Signal 040-00772	1) Preliminary plan approved by NRC; 2) characterization 8/90-12/90; 3) groundwater & added characterization may follow if more Th is found in 81, 8/91	Drum stabilization plan approved by NRC		Approve plan for site decommissioning 9/92	1) Perform stabilization, 9/90 2) Site decommissioning, 7/93	12/94	N/A	
Chemtron 040-08724	HARVARD AVE - pathway analysis in progress;  BERT AVE - site characterization in progress	HARVARD AVE - submit decon plan based on pathway analysis, 3/90  BERT AVE - submit decon plan, 3/90			HARVARD AVE - complete as per license condition, 6/90  BERT AVE - complete as per license condition, 10/90		HARVARD AVE - 12/90  BERT AVE - 12/90	Licenses in Chap 11 bankruptcy; may request leaving facilities at Harvard Ave. at levels greater than NRC GTP resulting in need for deed restrictions
Gulf Pauling (No Docket)	NRC and National Park Service reviewing options for site characterization; meet with GA and Gulf to discuss site characterization, 3/90	NRC and National Park Service reviewing options for site remediation; meet with General Atomics & Gulf to discuss site remediation, 3/90		TBD		TBD	TBD	Licensee no longer in business; potential unwillingness of General Atomics and Gulf to decontaminate site
Kerr-McGee (Cimarron) 070-01193	1) Complete for U & Pu buildings; 2) Characterization of U in soil in progress; NRC to meet with licensee, 3/90	1) Complete for U & Pu buildings; 2) Meet with licensee on U contamination in soil, 3/90; submittal of decon plan on U contam, TBD	Complete for U & Pu buildings	Complete for U & Pu buildings	1) Complete for Pu bldg; 2) In progress for U building 3) TBD for U contamination in soil	Survey of Pu building complete	Pu building - 1990	
Kerr-McGee Cushing (No Docket)	Characterization of sludge pit area, approximately 3/91	1) Proposes to decon areas around buildings by approximately 6/90; 2) To be submitted for sludge pit area, 3/92		1) Area around bldgs, approx. 6/90; 2) TBD for sludge pit area	1) Area around buildings by approximately 6/90; 2) TBD for sludge pit area	TBD	TBD	

Table 3 Site Decontamination Management Program Schedule

Site Identification	Site/Facility Characterization	Submittal of Decon/Deconn Plan	Status of NRC Review of Plan	Decon/Deconn Plan Approved	Decon/Deconn in Progress	Final Site Survey	Terminate License	Problems
<b>Level A Sites</b>								
Kerr-McGee West Chicago 040-02081	Complete for buildings	Complete for buildings	Complete for buildings	1) Complete for buildings; 2) NRC issues license amendment to place wastes in engineered storage cell, 2/90	1) In progress for buildings; 2) Soil removal from residential areas in progress			
Safety Light 030-05980	Plan conditionally approved by NRC; ASLB and ASLB partially stayed NRC order requiring funds for characterization	ASLB partially stayed NRC order requiring decon	TBD, pending outcome of hearings in progress	TBD		TBD	TBD	Safety Light, USR Industries, and the related corporations claim to be not capable of funding cleanup; USR and related corporations contest NRC jurisdiction
Texas Instruments Attleboro 070-00033	Complete	Submitted	Complete	Approved 1978	Complete 1983	Complete 1985	12/91	NRC to decide if acknowledgement of disposition of wastes is needed - 8/90; If needed, letter requesting acknowledgement to be sent to licensee - 11/90
UNC Wood River Junction 070-00820	Complete	Submitted	Complete	Complete	Complete	9&10 survey complete; meet with state of Rhode Island by 5/90	After 5/90	Small amount of groundwater contamination at less than 10 CFR 20 but above drinking water standards for SR-90 (not expected to delay license termination)
West Lake Landfill 040-08801	Response from Cotter Corporation due 3/90	Response from Cotter Corporation due 3/90		TBD		TBD	TBD	Cotter Corp. being held responsible for cleanup but has not yet indicated willingness to clean up site

Table 3 Site Decontamination Management Program Schedule

Site Identifi- cation	Site/Facility Characterization	Submittal of Decon/ Decomm Plan	Status of NRC Review of Plan	Decon/Decomm Plan Approved	Decon/Decomm in Progress	Final Site Survey	Terminate License	Problems
<b>Level B Sites</b>								
<b>Anax</b> 040-08820	Complete	Anax is transferring site to DOE	NRC sent site informa- tion to DOE, 12/89; Met with DOE, Anax, & West Va. after DOE evaluates site, TBD	NRC issues SER when all parties are in accord, TBD	DOE assumes site responsibility, TBD		12/90	
<b>B &amp; W Appollo</b> 070-00135	Some characterization and on- and off-site soil remediation in progress	NRC to write letter with request for written commitment on cleanup of inactive, contaminated areas, 5/90		TBD		TBD		
<b>BP Chem- icals</b> 040-07604	Characterization of ponds and soil in progress	Chemical reactor decon plan, 1/90; Site decon plan, 5/90	Complete review of: 1) Chemical reactor decon plan, 7/90 2) Site decon plan, 12/90	TBD		1995	1995	Ponds contain mixed waste; offsite burial options need to be explored
<b>Cabot Revere, Reading</b> 040-06940	Complete	REVERSE: Complete;  READING: 1) Bldgs - com- plete; 2) Dump portions of site - no plans to decon	REVERSE: Complete;  READING: 1) Bldgs - com- plete; 2) Dump - NRC to raise issue of decon during current renewal	REVERSE: Complete  READING: Bldgs, complete	REVERSE: Complete  READING: Bldgs, complete	REVERSE: NRC sur- vey, 9/90;  READING: awaiting request for release of bldgs	REVERSE: 12/90;  READING: 1) Bldg-10/90 2) Site-1993	REVERSE: termination may de- lay to 1992 if contamination found after radiation survey  READING: no plans to decon dump portion of site
<b>Dow</b> 040-00017	Complete	10 CFR 20.302 appli- cation for disposal of wastes at Salzburg land- fill submitted 11/89	NRC reviewing; meet with State of Michigan & EPA, 7/90	6/90	1991 - 1993	After 1993	After 1993	Resolve issue of accept- ability of disposal of radwastes at RCRA hazardous waste site
<b>GSA Watertown (No Docket)</b>	Complete	Complete	Complete	Complete; further NRC review needed to determine need for more cleanup	In progress since 1988; NRC inspection scheduled, 1990	TBD	TBD	



Table 3 Site Decontamination Management Program Schedule

Site Identi- fication	Site/Facility Characterization	Submittal of Decon/ Deconn Plan	Status of NRC Review of Plan	Decon/Deconn Plan Approved	Decon/Deconn in Progress	Final Site Survey	Terminate License	Problems
<b>Level B Sites</b>								
Heritage Minerals (Not Yet Licensed)	Characterization under NRC review as part of license application	No plan to decon at this time as facility is in operation	Review license applica- tion and determine if added cleanup is needed at this time, 9/90	Remove site from list if cleanup not needed, 12/90; if cleanup needed, approve decon plan, 6/91	12/91 (if cleanup needed)	9/92 (if cleanup needed)	N/A	
Euhawlin Landfill (No Docket)	Letter of agreement between NRC & Michigan for monitoring pro- gram for 3 years	Informal plan for Dow to take contaminated material	1) NRC review complete, 6/90 2) Agreement with Michigan and Dow on Dow plan, 7/90	TBD		TBD	TBD	No license; no specific funding arrangement for cleanup
Magnesium Elektron (No Docket)	Characterization under NRC review as part of license application	No plan to decon at this time as facility is in operation	Review license applica- tion & determine if added cleanup is needed at this time, 6/91	Remove site from list if cleanup not needed, 12/91; if cleanup needed, approve decon plan, 6/92	12/92 (if cleanup needed)	3/93 (if cleanup needed)	N/A	
Molycorp Washington, Pa 040-08778	In preparation, submittal date, TBD	In preparation, submittal date, TBD		TBD		TBD	TBD	Licenses not inclined to undertake needed cleanup per NRC specifications
Molycorp York, Pa 040-08794	In progress	Submitted; being revised per NRC review; Resubmittal date, TBD	1991	TBD		TBD	TBD	

Table 3 Site Decontamination Management Program Schedule

Site Identifi- cation	Site/Facility Characterization	Submittal of Decon/ Decomm Plan	Status of NRC Review of Plan	Decon/Decomm Plan Approved	Decon/Decomm in Progress	Final Site Survey	Terminate License	Problems
Level 3 Sites								
Pennco 040-08408	Site stabilized in 1988 & 1989 under EPA Super- fund; no added cleanup planned by EPA	Site stabilized in 1988 & 1989 under EPA Super- fund; no added cleanup planned by EPA		TBD		TBD	TBD	Licensee bankrupt; NRC to send letter to EPA regarding resolution of final cleanup, 4/90
Process Technology 030-07022	Required in license condition; submitted to NRC in 1989	Required in license condition; submitted to NRC in 1989	More information to be sub- mitted & reviewed on contam- ination and potential for more buried waste, 12/90	6/91	9/91	6/92	Amend license, 12/93	
Schott Glass 040-07924	Complete	Submitted to NRC, 1989	NRC questions to licensee; response pending	4/90	9/90	12/90	3/91	
Shield- alloy Cambridge 040-08948		1) Complete for non- slag areas; 2) Plan for Pile 1 due Spring 1990; 3) Plan for Pile 2 due early 1991	Complete for non-slag area	Approved for non-slag area	1) Complete for non- slag area; 2) Request for release of Pile 1 due early 1990	Complete for non-slag area	1) Non-slag area & Pile 1 - 12/90; 2) Pile 2 - 1992	
Westinghouse (Watts Mill) 070-00698	Submit at current license renewal	Submit at current license renewal	Late 1990 - early 1991	TBD		TBD	TBD	

Table 3 Site Decontamination Management Program Schedule

Site Identi- fication	Site/Facility Characterization	Submittal of Decon/ Decomm Plan	Status of NRC Review of Plan	Decon/Decomm Plan Approved	Decon/Decomm in Progress	Final Site Survey	Terminate License	Problems
Level C Sites								
Advanced Medical. 030-16055	Liquid waste holdup tank is sealed for decay until decommissioning	At license renewal in 1994, determine if decon of isolated liquid waste holdup tank is needed		TBD		TBD	TBD	
Army. Dept of 040-06394	Submit site characterization plan & enhanced environment- al monitoring program at license renewal, 6/90		Review plan and deter- mine if added cleanup is needed at this time, 6/92	Remove site from list if cleanup not needed, 12/92; if cleanup needed, approve decon plan, 12/92	6/93 (if cleanup needed)	12/93 (if cleanup needed)	N/A	If decon of site is necessary, removal of DU would be difficult
B & W Parks Township, Pa 070-00364		NRC to write letter with request for written commitment on cleanup of inactive, contaminated areas, 5/90		TBD		TBD	TBD	
Judd Co. 030-15963	Will be required at license renewal, 6/90	Will be required at license renewal, 6/90		3/91	12/91	3/92	4/92	
Cabor Corp Boyerstown 040-04690	Submitted in renewal application	Submitted in renewal application; no decon proposed at this time	Review plan for possible need for decon at this time	1991		TBD	TBD	
Fansteel 040-07580	Complete	Revised license requires submittal of decomm plan by 6/90	Complete review by 12/90	1990	TBD	TBD	TBD	

Table 3 Site Decontamination Management Program Schedule

Site Identi- fication	Site/Facility Characterization	Submittal of Decon/ Decomm Plan	Status of NRC Review of Plan	Decon/Decomm Plan Approved	Decon/Decomm in Progress	Final Site Survey	Terminate License	Problems
Level C Sites								
Hallin- chrodt 040-06563	None in progress	None planned; NRC to write letter with request for written commitment on cleanup of inactive, contaminated areas, 4/90		TBD		TBD	TBD	
Nuclear Metals 040-00672	In progress	To be submitted @ license renewal in 1990		6/91	1991-1996	12/96	Amend license, 6/97	On State of Massachusetts' "priority disposal site" list
Perma- grain 030-13573	Required per license condition; plan in preparation, submit 1990	Required per license condition,		12/91	6/92	3/93	6/93	
Benington Arms/US Army 040-08767	Submit 4/90	Submit 4/90		TBD		TBD		
Shield- alloy Newfield 040-07102	None in progress	None planned at this time; NRC to write letter with request for written commitment on cleanup of inactive, contaminated areas, 5/90		TBD		TBD	TBD	
Whittaker 040-07455	Review at license renewal, 1993	Review at license renewal, 1993		TBD		TBD	TBD	

Table 4 Site Decontamination Program Resources  
in Staff-Years

Organization	1990	1991	1992	1993	1994
Overall Program Management (a)					
LLWM	.75	1.25	1.25	1.25	1.25
Specific Site Project Management (a)					
LLWM	1.0	2.0(b)	2.0(b)	2.0(b)	2.0(b)
IMNS	2.0	2.9(b)	4.8(b)	4.8(b)	4.8(b)
REGION I	3.3	5.9	4.6	4.0	4.0
REGION III	1.0	1.0	1.0	1.0	1.0
OGC	1.0	1.0	1.0	1.0	1.0
Total	8.3	12.8	13.4	12.8	12.8
Policy Issues					
LLWM	.8	1.2	.13	.02	
IMNS	.32	.46	.13	.02	
REGIONS	.21	.2	.1		
RES	1.8	2.1	1.1	.16	
OGC	.18	.3	.13		
NRR	.19	.29			
Total	3.5	4.6	1.6	0.2	
Total Resources					
LLWM	2.5	4.5	3.4	3.3	3.3
IMNS	2.3	3.4	4.9	4.8	4.8
REGION I	3.5	6.1	4.7	4.0	4.0
REGION III	1.2	1.2	1.1	1.0	1.0
RES	1.8	2.1	1.1	.16	
OGC	1.2	1.3	1.1	1.0	1.0
NRR	.19	.29			
Total	12.7	18.9	16.3	14.3	14.1

Notes:

- (a) Does not include resources needed to review the decommissioning of reactor facilities contained in Appendix B
- (b) Includes resources for specific site project management for sites in Appendix A and review of sites decommissioned since 1965 discussed in Section E.6.

**Appendix A**

**Contaminated Site Descriptions**

## Appendix A

### Contaminated Site Descriptions

This section contains detailed descriptions of the contaminated sites requiring site characterization and/or decontamination or decommissioning and provides: 1) a discussion of the characteristics and problems associated with each site; and 2) a bases upon which the prioritization of the sites can be performed. The information in this appendix is summarized in Table 1. The description of each site is broken down as follows:

- (1) Site identification, including NRC project manager
- (2) Site description
- (3) Description of wastes and activities remaining onsite
- (4) Description of radiologic hazard
- (5) Financial Assurance/Viable responsible organization
- (6) Status of decontamination activities
- (7) NRC actions needed and timing

### List of Sites in Appendix A

The sites listed below are contained in alphabetical order in Appendix A.

1. Advanced Medical Systems, Inc.
2. Allied Signal Aerospace - Bendix Division
3. Amax
4. Army, Department of (Aberdeen Proving Ground)
5. Babcock & Wilcox, Apollo, PA
6. Babcock & Wilcox, Parks Township, PA
7. BP Chemicals, Inc.
8. Budd Company
9. Cabot Corporation, Boyertown, PA
10. Cabot Corporation, Reading, PA
11. Cabot Corporation, Revere, PA
12. Chemetron (Bert Avenue)
13. Chemetron (Harvard Avenue)
14. Dow Chemical Company
15. Fansteel, Inc.
16. Gulf United Nuclear Fuels Corporation (Pawling, NY)
17. Government Services Administration - Watertown Site
18. Heritage Minerals
19. Kawkawlin Landfill
20. Kerr-McGee (Cimarron)
21. Kerr-McGee (Cushing)
22. Kerr-McGee (West Chicago)
23. Magnesium Elektron
24. Mallinckrodt, Inc.
25. Nuclear Metals
26. Molycorp, Inc. (Washington, PA)
27. Molycorp, Inc. (York, PA)
28. Permagrain Products
29. Pesses (METCOA) Site
30. RTI Site
31. Remington Arms Co., Lake City Ammunition Plant Site
32. Safety Light Corporation
33. Schott Glass Technologies
34. Shieldalloy Metallurgical Corporation, (Cambridge, OH)
35. Shieldalloy Metallurgical Corporation, (Newfield, NJ)
36. Texas Instruments, Inc.
37. UNC Recovery Systems (Wood River Junction)
38. Westinghouse Electric Company (Waltz Mill Site)
39. West Lake Landfill
40. Whittaker Corporation



Advanced Medical Systems, Inc.

1. Site Identification

Advanced Medical Systems, Inc. License No. 34-19089-01  
1020 London Road Docket No. 030-16055  
Cleveland, OH

NRC Project Manager: B. Mallett, Region III

2. Site Description

Advanced Medical Systems, Inc. (AMS) manufactures Co-60 and Cs-137 sources for use in medical teletherapy devices and radiography machines. The licensee has the authority to possess up to 300,000 Ci of Co-60 and 40,000 Ci of Cs-137 in any form, for the manufacture, installation and servicing of sealed sources. Access to the entire facility is controlled by lock and key and is considered to be a restricted area under 10 CFR Part 20.

AMS is located in an industrial and residential neighborhood on London Road on the east side of Cleveland, OH. The facility is in the northeastern end of a large warehouse building formerly occupied by Picker Corporation, who used it for similar operations. AMS occupies about 2,000 square feet of the 8,000 square foot building. The rest of the building is currently unused. The facility utilizes three floors of the building. The main floor consists of an office area, the Isotope Shop area, the Hot Cell, the Shielded Work Room, a storage area, and miscellaneous unoccupied areas. The second floor includes additional unoccupied space, the Mechanical Equipment Room, and the Exhaust Ventilation Equipment Room. The basement includes the former Dry Waste Storage Area, the Liquid Waste Handling Room, the former Liquid Waste Holdup Tank Room, and additional unoccupied space. Waste is stored in a locked room with roped areas on the south side of the warehouse area.

As the result of poor radiation safety practices, plant operations have seriously contaminated the facility, including a sewer drain. In 1985, at the request of the NRC Oakridge Associated Universities (ORAU) performed an assessment of the fire protection and operational safety programs at AMS. ORAU recommended that AMS should perform a decontamination of the Hot Cell, the ventilation system, the dry waste storage area, the liquid waste area, the holding tank and piping, and plug a basement floor drain to minimize contamination of the sanitary sewer system.

The 1985 ORAU assessment included a site survey. This survey showed Hot Cell exposure rates up to 2,100 R/hr at the table level. The average exposure rate at the table level was 390 R/hr. A few Co-60 pellets had been placed in a known position at the rear of the cell. Survey measurements made on the first floor ranged from 0.1 to 1,300 mR/hr. The

high reading was taken at the window of the old hot cell. On the second floor exposure levels ranged from 0.2 to 3,000 mR/hr. The high reading was taken at a HEPA filter. In the basement exposure rates ranged from 1.0 to greater than 20,000 mR/hr. The high reading was taken at vac/HEPA box. Smear samples showed contamination up to  $1.51 \text{ E6 dpm/100 cm}^2$  in the Hot Cell Round Access Port in the Isotope Shop Area. Co-60 air concentrations in the decontamination room and the Isotope Shop Area were within a factor of ten of the 10 CFR Part 20 limits. The sediment from the loading dock drain indicated detectable, but low, concentrations of activity. A water sample from the Liquid Waste Room floor contained  $1.75 \text{ E5 pCi/l}$  of Co-60.

Samples were also taken in sediment, soils, vegetation, and water in the vicinity of the facility. No detectable offsite Co-60 concentrations were found. However, some detectable levels were found in sediments, soil, and vegetation in the south region of the AMS property. ORAU considers this to be indicative of contamination from effluent releases from the stack. Sediment collected in storm drain at the loading dock and at the east end of the building contained low, but detectable levels of Co-60. ORAU stated that these levels pose no threat to public health and safety.

A subsequent ORAU survey was performed in November 1988. This survey included sample analysis from a sanitary sewer. Access was prohibited to this sewer by locking manhole covers. Exposure rates up to 20 mR/hr were measured. Water samples from the sewer up to  $150 \text{ pCi/l}$  and sediment samples up to  $640 \text{ pCi/l}$  were found. No Cs-137 was detected.

On July 23, 1987 the NRC issued AMS an order to cleanup the facility so that operations could continue safely. This order stated that decontamination was to be initiated no later than August 31, 1987 in accordance with a decontamination plan submitted by AMS in September 10, 1986. On October 30, 1987 the NRC amended the order requiring AMS to initiate decontamination by August 31, 1987 and complete the decontamination by April 1988 in accordance with a revised plan submitted by AMS on October 20, 1987. The licensee undertook cleanup operations with the objective of cleaning the facility to levels that permit continued operation. The licensee does not intend to decommission the facility at this time, but plans to continue his current sealed source manufacturing activities.

At this time AMS has nearly completed the cleanup operations. The cleanup criteria are suitable levels for continued operation. Unrestricted release criteria are not being applied. The Holdup Tank Room, however, has exposure rate levels of about 2,000 R/hr at 30 cm. The NRC considered that this very high activity level was too high to compel cleanup at this time. Consequently, the NRC gave AMS permission to seal and monitor the Holdup Tank Room until the radiation levels are low enough to permit decontamination. The NRC will perform an evaluation of the necessity to

cleanup this room at the next renewal of the license, which is scheduled to occur in December 1994.

3. Description of Wastes

The contaminated material in the AMS facility consists primarily of Co-60 contaminated equipment and concrete. Some Co-60 contaminated soil and sewer piping also exist. The contaminated contaminated equipment and concrete contain a wide range of activity levels from materials that can be handled without remote means and material with exposure rates up to 2,000 R/hr at 30 cm. Co-60 pellets used in the manufacture of sealed sources may be present. The contaminated soils and sewer piping have relatively low levels of activity with exposure rates up to 20 mR/hr.

The Co-60 material is in a metal flake or shaving form. The licensee is not currently using Cs-137 and the bulk of this material is contained in sealed sources and stored as retired sources or sources returned from customers.

With the exception of the Liquid Waste Holding Tank Room, the licensee has nearly completed decontamination efforts to lower activity levels that would allow continued operations to be performed safely. At the time of decommissioning additional cleanup may be necessary. The Liquid Waste Holding Tank Room is expected to remain sealed until the exposure levels are reduced.

4. Description of the Radiologic Hazard

The principal hazards associated with the contamination at the AMS facility are direct exposure, inhalation, ingestion, intrusion, and groundwater. No immediate threat to public health and safety exists. The direct exposure hazards have been substantially reduced by the cleanup activities undertaken by the licensee. The Liquid Waste Holdup Tank Room is shielded and access prohibited by a concrete block wall. Sufficient shielding exists to reduce exposure levels outside the room to less than 30 mR/hr to workers in the clean side access areas. Inhalation and ingestion pathways are minimized by ventilation systems containing HEPA filters and by the protection of hot cells and sealed rooms. Intrusion into the facility is unlikely since the facility is protected as a restricted area. In addition, the high activity contamination in the Liquid Waste Holdup Tank Room is isolated and access to the room is prohibited. Contamination offsite presents no public safety hazard. Offsite groundwater hazards are low based on sampling data that show Co-60 activity levels at or just above background.

5. Financial Assurance Required and Responsible Organization

The possession limits for AMS are 300,000 Ci of Co-60 in any form and 40,000 Ci of Cs-137 in any form. The current license expires on December

1994. AMS will need to provide a financial certification in the amount of \$750,000 by July 27, 1990 and a decommissioning funding plan by December 1994.

AMS will continue to operate the facility and is considered to be capable of providing the financial assurance for decontamination and decommissioning as required under NRC regulations.

6. Status of the Decontamination Activities

AMS has nearly completed cleanup operations as required under NRC Orders. The NRC agreed that Liquid Waste Holdup Tank Room can be left in a sealed condition, but stated that the cleanup of the room would need evaluated at the next renewal of the license. Cleanup activities at the site have been undertaken to allow operations to continue in a safe manner rather than to allow unrestricted release. AMS plans to continue active sealed source manufacturing operations into the future and does not plan to decommission the facility in the near-term.

7. NRC Actions and Timing

NRC Region III staff concurred with the final survey report during the Spring of 1989. The levels determined after cleanup were suitable for continuous operation. Effective December 13, 1989 the license was renewed for the 1989 - 1994 operating period. The next license renewal is expected by November 30, 1994. At the next renewal of license the NRC staff will evaluate whether decontamination activities should begin in the Liquid Waste Holdup Tank Room.

## Allied Signal Aerospace - Bendix Division

### 1. Site Identification

Allied Signal Aerospace  
Bendix Division  
Teterboro, NJ

License No. STB-424 (EXPIRED)

Docket No. 040-00772

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

In the 1940's, the Bendix Corporation (now Allied Signal) built and operated for the Navy a magnesium foundry for the production of magnesium, magnesium-thorium, and aluminum castings. In 1961, the Navy discontinued its involvement with the foundry, however Bendix continued operations of the foundry on a limited basis until 1968, when operations ceased. The foundry buildings were then closed and cleaned out and the buildings were converted for office space in 1969.

Use of thorium may have begun at the Teterboro site as early as 1941. However, Bendix representatives have stated that prior to 1958, only limited thorium-magnesium technology existed and, therefore, use of large amounts of thorium was unlikely until 1958. AEC licenses were issued to Bendix Corporation during the period 1958 to 1973 for the possession of up to 10,000 pounds of 40% thorium-magnesium hardener for the production of up to 4% thorium-magnesium alloy. The process consisted of 40% thorium alloy being received at the foundry in the form of small metal pellets and being added to the magnesium to produce standard magnesium-thorium alloys containing 3.3% thorium.

The most recent source material license for which records can be found expired in 1973, although there is some indication another thorium license may have been active until 1975.

In the late 1970's Bendix sold 23 acres of the site to Metpath, Incorporated, and 7.5 acres of the site to Sumitomo Machinery Corporation.

In January 1988, during a survey of the Teterboro area, the DOE identified several drums of radioactive material along the outside of the fence line along the drainage ditch of the property now belonging to Metpath (see Figure). DOE analysis indicated that the drums contained natural thorium. Radioactive material was also identified on the former Bendix property now owned by Sumitomo. Representatives of Metpath and Sumitomo indicated that they had no knowledge of the contamination until the DOE survey.

The drainage ditch is an open ditch running along the western property

line of all three properties. The ditch is six feet below the existing site elevations and eight feet across. The ditch is eventually pumped into Berry's Creek, a tributary of the Hackensack River. The ditch has been observed to have water levels of as little as 6 inches or as much as 4 or 5 feet.

The water table is found at very shallow depth (i.e. 2 to 5 feet) across the site. Groundwater flow is estimated to be locally towards the boundary drainage channels found on the east and west sides of the plant.

### 3. Description of Wastes

As noted above, buried fifty-five gallon drums are located on the Metpath property outside the existing fenceline. About 15 to 20 drums are visible, beginning about eighty feet south of the current Bendix property and extending one hundred feet along the bank of the western drainage channel. These drums can be easily seen, ranging in location from near or top of the bank down to the water line. Some of the drums have deteriorated, exposing material which appears to have a physical consistency ranging from concrete-like to wet and crumbly.

Following the DOE survey identified above, the NRC performed an investigation beginning in March 1988. Samples taken from four of the drums were found by NRC to contain as much as 480 pCi/gm of thorium. Soil samples taken from the drainage channel along the Metpath and Sumitomo properties had thorium levels of 0.7 to 25.4 pCi/gm. The normal environmental concentrations of thorium in soil typically are in the range of 0.2 to 1.3 pCi/gm. Based on this data, two of the four drums sampled exceeded the concentration of thorium which is exempted from licensing by 10 CFR 40.13(a).

Radiation levels along the inside of the Metpath fenceline were at background (4 to 6 uR/hr for this area). Radiation levels along the outside of the fence were also at background except where the drums were located where the radiation levels were 40-60 uR/hr. Radiation levels near the waterline ranged from 4-12 uR/hr, except where the drums were located. The exposed drums found along the water line had contact radiation levels ranging from 40 to 800 uR/hr. Radiation levels at 1 m above ground at the water line ranged from 4 to 80 uR/hr.

Based on the surveys, the source of the contamination is likely the thorium used in earlier site activities and the source of the radiation levels along the bank is the drums.

DOE also surveyed the Sumitomo property. Soil samples taken from the property indicated radium-226 contamination. No thorium was noted in these samples. The sample west of the building contained 315 pCi/g, and the sample from the northeast corner contained 2500 pCi/g. Environmental

concentrations of Ra-226 in soil typically are in the range of 0.5-2.0 pCi/g. This material is regulated by the State of New Jersey.

The survey of the Sumitomo property identified a 25 by 30 foot area in the northeast corner with radiation levels ranging from 14 to 100 uR/hr. One spot had a reading of 2000 uR/hr. Several discrete spots were noted on the west and south sides of the Sumitomo building with levels of 20 to 30 uR/hr, with one spot of two inches in diameter having a level of 3000 uR/hr. Surveys along the drainage ditch had levels of 20 - 30 uR/hr. All other areas were background.

#### 4. Description of Radiologic Hazard

There is no immediate threat. The material in the drums is not accessible to persons working on the property or to the general public, due to presence of fencing. Surveys by the NRC and by the State of New Jersey indicate that the drum material does not appear to be moving, even though it is near the drainage ditch. In order to minimize the threat, Bendix is planning to stabilize the area where the drums are located while a complete characterization of the site is completed. For a discussion of the stabilization and characterization plans, see Section 6 below.

NRC noted in a letter to Allied, dated 5/12/89, that "stabilization of the bank is necessary in order to contain the spread of the radioactive material from the deteriorated drums in the bank." It is important that this area be stabilized; DOE noted that the area where the drums are located is fenced, but that "the drums are in poor condition and are releasing material to the environment," and that "while we have not identified any immediate hazard to the public or your (Metpath) workers associated with these drums, you may wish to take some interim steps to prevent the migration of the material from the site."

Once the drum area is stabilized, remaining contamination consists of soil contamination at isolated spots onsite, which is fenced, thus minimizing the hazard.

#### 5. Financial Assurance/Viable Responsible Organization

The financial assurance requirements of the decommissioning rule do not apply since Allied is not a licensee. Region I previously considered whether to require Allied to become licensed and decided it was not necessary. This decision will be reconsidered following the characterization of the site.

With regard to viability of a responsible organization, Allied has entered into an agreement with Metpath and Sumitomo by Memorandum of Understanding, dated 10/24/88, by which Allied will take the lead in characterization and stabilization activities regarding radioactive material on all of the companies' properties at Teterboro, including

providing funding, and determine what remediation actions, if any, are required on the properties.

Allied Signal is the parent company of Allied Signal Aerospace - Bendix Division. Bendix currently holds NRC License No. 29-15797-01 which authorizes the possession of a Lixiscope containing I-125.

6. Status of the Decontamination Activities

A stabilization plan for the drums was submitted to the NRC and was approved by NRC on 3/23/89. The stabilization plan consists of determining the number of drums, delineating the stabilization area, obtaining a stream encroachment permit from the New Jersey Dept. of Environmental Protection, erection of a coffer dam around the drums, and placing a synthetic cover over the entire closure. The stabilization plan will be carried out in a manner as to facilitate the remediation of the area at a future date.

The plan was submitted to the State of New Jersey, but has not yet been approved.

The site characterization plan was submitted to and approved by NRC on September 9, 1989. This plan consists of a search for radioactive material on the site. Depending on whether additional thorium is found, additional characterization, including groundwater characterization, will be required. The site characterization plan was also submitted to the State of New Jersey, but has not yet been approved.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

- |   |                       |
|---|-----------------------|
| 1. Inspect implementation of the stabilization plan   | <u>September 1990</u> |
| 2. Inspect implementation of the site characterization plan   | <u>September 1990</u> |
| 3. Require additional characterization of the site, including groundwater, if necessary                                     | <u>August 1991</u>    |
| 4. Review and approve decommissioning plan for cleanup of drainage ditch area and other site areas with soil contamination. | <u>September 1992</u> |
| 5. Inspect implementation of decommissioning plan   | <u>July 1993</u>      |
| 6. Perform NRC closeout survey  | <u>December 1994</u>  |



Amax

1. Site Identification

Amax  
Wood County, West Virginia  
Docket No. G40-8820  
NRC Project Manager: J. Swift

2. Site Description

The site is located in Washington Bottoms, Wood County, West Virginia, on the east side of the Ohio River. The engineered cell containing the thorium and uranium occupies 15.16 acres and is surrounded by a 6-foot-high security fence. Four groundwater monitoring wells have been monitored semiannually since 1985.

3. Description of Wastes

Thorium and uranium: 100,000 pounds mixed in soil and rubble. The cell also contains pyrophoric material that will slowly oxidize to  $ZrO_2$ .

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The waste contains only low concentrations of natural thorium and uranium and is confined in an engineered cell.

5. Financial Assurance/viable Responsible Organization

The site is owned by Amax, Inc. Well monitoring is performed by the State of West Virginia. This site will be transferred to the U.S. Department of Energy (see #7 below). Amax has been responsible in site-related activities to date.

6. Status of the Decommissioning Activities

The contaminated soil has been retained in an engineered disposal cell since December 1982. Well monitoring since then shows no signs of leakage of radionuclides.

Amax is in the process of transferring this site to the U.S. Department of Energy (DOE) pursuant to the provisions of Title I, Subtitle D, Section 151 (c), of the Nuclear Waste Policy Act of 1982.

*Have had several  
explosions when  
but closing*

7. NRC Actions Needed and Timing

On December 21, 1989, NRC sent DOE pertinent documents for their evaluation of the site prior to assuming control. Upon receipt of DOE evaluation a meeting between NRC and DOE will be arranged. Following this meeting, an onsite meeting among NRC, DOE, Amax and the State of West Virginia will be arranged. When all parties are in agreement the NRC will issue a SER with the required findings, DOE will assume responsibility for the site and the license will be terminated. It is projected that this process can be completed in 1990.

Department of Army  
Aberdeen Proving Ground

1. Site Identification

Department of the Army  
Aberdeen Proving Ground, Md

Docket No. 040-06354  
License No. SMB-141

NRC Project Manager: John Kinneman, Region I

2. Site Description

The US Army Aberdeen Proving Ground (APG) is an active designated Dept of Defense major test facility. One of the main functions performed at APG is to plan and conduct development tests, initial production tests, and other tests of ammunition for the various weapons systems within the Army inventory.

Aberdeen Proving Ground is licensed by the NRC to perform testing of depleted uranium (DU) projectiles and other forms of DU, a licensed radioactive material. The Army is presently involved in development of ammunition with penetrators made of DU.

The testing which has resulted in environmental contamination consisted of firing projectiles at soft targets for evaluation and accuracy. The projectile does not break up in the target and impacts the ground somewhere within a restricted area. The license states this is environmentally of low consequence because the round does not disintegrate and because of the low solubility of DU in water. The licensee is planning to minimize the amount of DU impacting in the firing area by building a sand field "Catch Box".

An environmental monitoring program in place at APG is designed to evaluate the effectiveness of controls placed on efficient releases of radioactive materials and is used to demonstrate compliance with NRC and Army regulations.

While little is currently known about groundwater at the site, the USGS has begun a major investigative effort to determine the status and structure of the geology and groundwater.

3. Description of Wastes

Outdoor firing of DU munitions is performed currently at the Soft Target Range. An area approximately 5 miles by 2 miles in the Soft Target Range is contaminated with approximately 70,000 kilograms of fired DU rounds. The distribution of rounds is not uniform throughout the area. The Soft Target Area is also contaminated with a large amount of unexploded ordnance.

4. Description of Radiologic Hazard

There is no immediate threat from this site. Access to the site is controlled by guarded gates. An Environmental Radiological Monitoring Plan is in place which is based on analysis of pathways in which radio-nuclides would travel through the environment. Since 1978, environmental radiation monitoring has been performed at the Soft Target Range. The area where DU cores are most likely to be found is drained primarily by Mosquito Creek to the north and by Delph Creek to the south. Samples of soil, water, vegetation, and sediment have been collected quarterly at the Mosquito Creek and Delph Creek sampling points since 1979 and the results of this monitoring show that DU testing has caused no increase in the amount of radioactivity at these sampling points.

Although the environmental monitoring program to date has shown no threat, an enhanced environmental monitoring program (discussed below) is being instituted by the Army to better characterize the impact of the DU testing on the environment.

5. Financial Assurance/Viable Responsible Organization

Based on the decommissioning rule, a decommissioning funding plan will be required by July 27, 1990. A question has been raised as to whether the site should be exempt from this requirement due to the expected long term use of the facility. If a funding plan is deemed necessary, use of a statement of intent would be acceptable because the Army is a government agency.

No problem with viable responsible organization is foreseen as the Army is a government agency and has committed to the enhanced environmental monitoring program.

6 Status of the Decommissioning Activities

The Soft Target Area is in current use and is planned to be in use for the foreseeable future; therefore, there is currently no plan to clean to unrestricted use criteria.

However, to better characterize the effect of the spent DU rounds on the environment, the NRC indicated that as part of the license renewal process NRC would conduct a thorough review of the environmental effect of such firing at Aberdeen. The Army has committed to submit such information and

to reanalyze and enhance their environmental monitoring program by contracting with Battelle Pacific Northwest Laboratories to review the program and provide the Army with recommended improvements.

The license renewal application due will contain results of site characterization so as to assess the environmental effects, if any, of DU rounds.

As noted above, no site cleanup is planned at this time. At this time, no significant environmental migration of DU has been found, although additional characterization is under way. Due to the large area involved and the large amount of non-radioactive unexploded ordinance, it will be very difficult to decontaminate and release the Soft Target Area for unrestricted use.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

- |   | <u>Date</u>          |
|---|----------------------|
| 1. Review the renewal application submitted by the licensee, including the evaluation of the environmental contamination of the spent DU rounds and the revised Environmental Monitoring Program. | <u>June 1991</u>     |
| 2. Determine if additional cleanup of the site or license condition is needed at this time  | <u>June 1992</u>     |
| 3. If added cleanup is not needed, remove site from list of sites.  | <u>December 1992</u> |
| 4. If added cleanup is needed, review and approve decontamination plan  | <u>December 1992</u> |
| 5. Inspect implementation of decontamination plan   | <u>June 1993</u>     |
| 6. Perform NRC survey of area being decontaminated and remove site list of sites  | <u>December 1993</u> |

B. Potential problems inhibiting site cleanup

None if renewal application shows added cleanup is not necessary. However if added cleanup is needed, decontamination of the site may be difficult as noted in Section 6 above.

*Contamination not  
related to operations.*

Babcock and Wilcox, Apollo Pa.

1. Site Identification

Babcock & Wilcox, Pennsylvania Nuclear Service Operations  
Apollo, Pennsylvania  
Docket No. 70-135  
NRC Project Manager: J. Swift

2. Site Description

The five acre site is located in a mixed commercial/residential area next to the Kiskiminetas River in the center of Apollo Borough, which is in western Pennsylvania, about 30 miles northeast of Pittsburgh. There are a former uranium fuel processing and fabrication plant and a laundry building on the site. The plant is contiguous with a metal fabrication plant operated by another company. Fuel activities were discontinued and partial decontamination begun in 1980. In recent years, the plant has housed radioanalytical laboratories, principally for measurement of contamination in soil from the Apollo and nearby Parks Township facility sites. Babcock & Wilcox has pending an application for license renewal to conduct research and development on soil and materials decontamination and for storage and staging of equipment and components destined for its Parks Township facility.

3. Description of Wastes

There is some residual uranium contamination in certain parts of the plant from previous operations, including a concrete mezzanine floor containing kilogram quantities of high enriched uranium. There is also uranium contamination in soil around the plant, the adjacent metal fabrication plant, a sewer, and the Kiskiminetas River bank at two sewer outfalls. The extent of soil contamination, with the exception of a few areas, has been characterized by Babcock & Wilcox. They estimate about 200,000 cubic feet of soil are contaminated at an average concentration of about 100 pCi/g.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The facility is under the control of and being operated by the licensee. The only substantial contamination at present is low-solubility uranium in fairly low concentrations in soil. The licensee has determined that there are no hazardous materials associated with the uranium contamination.

5. Financial Assurance/Viable Responsible Organization

The site is owned by Babcock & Wilcox and all currently licensed activities are conducted by Babcock & Wilcox. The site was previously owned by ARCO and NUMEC. Babcock & Wilcox is willing and able to undertake necessary cleanup activities, although ARCO has some liability for the costs of such activities.

6. Status of the Decommissioning Activities

Babcock & Wilcox is continuing its site characterization and does not have a formal decontamination plan. However, the NRC did approve a decommissioning plan in 1978, which essentially provides for financial assurance and a general outline of decommissioning actions.

Babcock & Wilcox has no plans to decontaminate the plant, inasmuch as it will continue to be used for nuclear activities. Limited areas of contaminated soil on and adjacent to the site have been remediated, with the soil being stored onsite for future disposition. Similar remediation is ongoing in an unfloored area of the adjacent metal fabrication plant.

7. NRC Actions Needed and Timing

NRC maintains continuing contact with the licensee to monitor the site characterization and decontamination activities. In the near future, NRC will arrange for a confirmatory survey of the area being remediated and surveyed by Babcock & Wilcox in the adjacent plant. Similar surveys will be arranged as Babcock & Wilcox remediates additional areas adjacent to the plant during the next several years.

NRC expects to issue in the first quarter of 1990 an Environmental Assessment in connection with renewal of Babcock & Wilcox's license.

Babcock and Wilcox, Parks Township, Pa

1. Site Identification

Babcock & Wilcox, Pennsylvania Nuclear Service Operations  
Parks Township, Pennsylvania  
Docket No. 70-364  
NRC Project Manager: J. Swift

2. Site Description

The 40 acre site is located in a rural area across the highway from the Kiskiminetas River in Parks Township, which is in western Pennsylvania, about 35 miles northeast of Pittsburgh. There are three principal buildings on the site, formerly used for plutonium fuel fabrication, high enriched uranium fuel preparation, and hafnium bar production. Fuel activities were discontinued and partial decontamination begun in 1980. In recent years, the plutonium and hafnium plants have been used for decontamination and refurbishment of nuclear reactor components and equipment. Babcock & Wilcox has pending an application for license renewal for continuation of these activities.

3. Description of Wastes

There is some residual plutonium contamination in certain parts of the plutonium plant, and residual high enriched uranium in the uranium plant. There are uranium and thorium wastes (from Apollo) in identified trenches in a burial ground on the site. As a result of exhumation of the trenches in the mid-1960's, surface soil became contaminated, but it has been remediated to less than 30 pCi/g by 1987. The disposed material probably involves kilogram quantities of uranium and thorium in a volume of a few hundred thousand cubic feet.

4. Description of Radiologic Hazard

The site poses no immediate threat to the public. The facility is under the control of and being operated by the licensee. The only substantial contamination at present is low-solubility uranium and thorium that was disposed of by burial by NUMEC prior to 1971.

5. Financial Assurance/Viable Responsible Organization

The site is owned by Babcock & Wilcox, and all currently licensed activities are conducted by Babcock & Wilcox. The site was previously owned by ARCO and NUMEC. Babcock & Wilcox is willing and able to undertake necessary cleanup activities, although ARCO has some liability for the costs of such activities.



6. Status of the Decommissioning Activities

Babcock & Wilcox continues its plutonium decontamination of the plutonium plant and does not have a formal decontamination plan. The NRC approved a decommissioning plan in 1978, which essentially provides for financial assurance and a general outline of decommissioning actions.

Babcock & Wilcox has no plans to decontaminate its plants, inasmuch as it will continue to use them for nuclear activities. Babcock & Wilcox also has no plans to decommission the disposal area.

7. NRC Actions Needed and Timing

NRC received from Babcock & Wilcox in January 1990 an acceptable, revised groundwater monitoring plan for the disposal area. Implementation has begun and will be followed by NRC as the program becomes operational during 1990. NRC will evaluate the groundwater monitoring data annually with regard to indications of need for remedial action at the disposal area.

BP Chemicals America, Inc.

1. Site Identification

BP Chemicals America, Inc.  
Lima, Ohio  
Docket No. 040-07604  
NRC Project Manager: J. Swift

2. Site Description

The site is located at Fort Amanda Road and Adgate Road on the southwest side of the city, on the east side of the Ottawa River. The facility is an active petrochemical operation

3. Description of Waste s

About two hundred 55-gallon drums with greater than 35 pCi/g depleted uranium mixed in sandblast medium. Four ponds contain an estimated 480,000 cubic feet of liquid and 490,000 cubic feet of solid hazardous waste. A uranium catalyst was used in five acrylonitrile reactors, resulting in their internal parts being contaminated. Two process buildings, auxiliary facilities, and several acres of land are contaminated.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public as it is an industrial site with controlled access.

5. Financial Assurance/Viable Responsible Organization

The site is owned by BP Chemicals America, Inc. BP Chemical is believed to have the resources necessary to decontaminate the site. BP's representatives have indicated they plan to do this within a few years.

6. Status of the Decommissioning Activities

Decontamination plan for the ponds has been submitted, but NRC staff has not completed an evaluation of its adequacy. This plan is subject to approval of the Ohio EPA. Because the ponds contain mixed waste, BP was told to explore offsite burial options. The decontamination plan for the first acrylonitrile reactor was submitted January 3, 1990. A revised plan for the rest of the site is expected by May 1990.

The Catalyst building and warehouse were decontaminated and released for unrestricted use on December 22, 1988. By letter dated January 3, 1990, BP provided NRC with the results of an October 1989 radiological survey and assessment of the internals of their Acrylonitrile II Unit "B" reactor, associated components, and downstream equipment. This letter also stated that a full scale radiological assessment of the remaining contamination of their Lima facility was being conducted. At a January 23, 1990, meeting, BP informed NRC that there are four additional reactors that are contaminated. BP plans on resuming decontamination during 1990.

7. NRC Actions Needed and Timing

The staff will complete its review of the proposed decontamination plan for the first acrylonitrile reactor by July, 1990. The staff will begin evaluating onsite disposal of contaminated ponds. Once offsite options are provided these will also be evaluated. The staff will evaluate the decontamination plans for the rest of the site by December 1990. Once decontaminated, confirmatory surveys will have to be performed. License termination is projected for 1995.

## Budd Company

### 1. Site Identification

The Budd Company  
Philadelphia, PA

License No. 37-05680-04  
Docket No. 030-19963

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

In 1967, the Budd Company's facility in Philadelphia, PA, which had manufactured sealed iridium-192 and cobalt-60 sources for use in industrial radiography underwent decontamination and shutdown operations. This included removal of all byproduct material and movable equipment and cleaning and painting of the facility in all parts of the facility except the hot cell.

All access openings to the hot cell (door, shielded window opening, master-slave ports, ventilation and exhaust ports) were sealed with 16 inch thick solid concrete block followed by a 1 inch thick finish coat of smooth mortar. In addition structural steel barriers were added directly forward of the sealed door opening and the sealed shielded window opening to prevent accidental damage.

The interior of the enclosed hot cell is maintained as a restricted area. Access to the remainder of the facility is unrestricted. Groundwater is not an issue at this site since the activity is confined to the building.

Physical surveys are conducted annually at the facility.

### 3. Description of Wastes

At the time of facility shutdown, the quantity of cobalt-60 levels in the hot cell was less than 5 curies. As of August 1988, approximately 0.3 curies of Co-60 remain in the hot cell. The volume of contaminated material has not been estimated.

### 4. Description of Radiologic Hazard

There is not an immediate threat. Radioactive material is contained in the hot cell which as noted above has all access ports sealed with concrete and mortar, with structural steel coverings to prevent damage. The hot cell is under license with the only authorized use being sealed for progressive decay. In addition, the licensee is to perform testing for leakage from the sealed hot cell at intervals not to exceed one year.

5. Financial Assurance/Viable Responsible Organization

Region I plans to require decommissioning and termination of the license at the next renewal. Funding information will be submitted at that time.

The Budd Company continues to own the facility and appears financially capable of carrying out the decommissioning activities.

6. Status of the Decommissioning Activities

The licensee was informed that NRC will require decommissioning of the hot cell during the upcoming license renewal process. A decommissioning plan will be required as part of the renewal application. The renewal has been filed. The decommissioning plan will be requested as part of the deficiency letter.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

	<u>Date</u>
1) Require decommissioning plan at license renewal;	<u>June 1990</u>
2) Review and approve decommissioning plan	<u>March 1991</u>
3) Inspect implementation of decommissioning plan	<u>December 1991</u>
4) Perform NRC closeout survey	<u>March 1992</u>
5) Terminate license	<u>April 1992</u>

B. Potential problems inhibiting site cleanup

None at this time

Cabot Corp., Boyertown, Pa

1. Site Identification

Cabot Corporation  
Boyertown, Pennsylvania  
Docket No. 040-06940  
NRC Project Manager: J. Swift

2. Site Description

The site is located in a rural setting in southeastern Pennsylvania, 1.5 miles northeast of Boyertown. The site occupies 160 acres. Cabot processes ores and slags to extract tantalum and columbium. Natural uranium and thorium are present in the ores and slags in sufficient concentration to require a source material license. The Boyertown plant received an NRC license in 1963 and is still operating under that license.

3. Description of Wastes

When the ores and slags are processed to extract tantalum and columbium, the left over sludges contain natural uranium and thorium. The combined concentration of uranium and thorium in the sludges is a maximum of 2 percent by weight, but more typically a few tenths of a percent. Cabot does not consider these sludges to be waste, but plans to keep them in storage for possible future processing.

In addition to the sludges, there are several settling ponds on the site that contain small amounts of uranium and thorium in their sediments.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. Most of the uranium and thorium is contained in sludges stored in concrete vaults.

5. Financial Assurance/Viable Responsible Organization

Cabot Corporation owns the site and is currently under license. Cabot is a large company with the resources to decontaminate the site.

6. Status of the Decommissioning Activities

The latest license renewal application contains a formal decommissioning plan and states the intention of removing all sludges from the site when the facility is eventually closed.

The plant is operating at present and no decontamination activities are in progress.

7. NRC Actions Needed and Timing

The staff will review the renewal application and decommissioning plan; license renewal is expected to be completed in 1991. The condition of the site will be reviewed with regard to need for interim decontamination, as part of the renewal process.

Cabot Corp., Reading Pa

1. Site Identification

Cabot Corporation  
Reading, Pennsylvania  
Docket No. 040-06940  
NRC Project Manager: J. Swift

2. Site Description

The site is located in an industrial part of the city of Reading. From 1967-1969, Cabot used a building on the site to process tin slag for the purpose of extracting columbium and tantalum. Natural uranium and thorium were present in the slag in sufficient concentrations to require a source material license. Processing stopped in 1969, but ores and slags were stored there for some time thereafter.

3. Description of Wastes

Only trace quantities of natural uranium and thorium remain in the building used for processing. Waste slag, containing an average of 0.16 percent thorium and 0.04 percent uranium, was dumped down the slope of an embankment on the edge of the site during the two years of processing. An estimated 600 tons of slag was dumped, mostly as large chunks weighing several tons each. The slag is a black, glass-like material with very low solubility.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The uranium and thorium are contained in insoluble slag. Cabot samples the groundwater around the slag pile and monitors the area for erosion.

5. Financial Assurance/Viable Responsible Organization

The site was never owned by Cabot, only leased. The present owner is Hamburg Fabrication. It is believed that Cabot can and will responsibly decontaminate the site.

6. Status of the Decommissioning Activities

Cabot has decontaminated the building and its immediate surroundings as necessary for unrestricted release, and will present this information to NRC to request release for unrestricted use. They have not planned to request release of the dump portion of the site.



All ores and slags stored on the site have been removed except from the dump portion. Contaminated soil has been removed and transported to Cabot's Boyertown site. ORAU surveyed the building area in 1985, and found some remaining contamination. Cabot believes that they have cleaned this up and have requested that the process building be removed from the license. They have no plans for decontaminating the dump portion of the site.

7. NRC Actions Needed and Timing

Once a request for release of the building is received a confirmatory survey will be performed. The building could be ready for release for unrestricted use by October 1990. Staff will raise the issue of decontamination of the dump portion of the site to Cabot during the ongoing license renewal process. It is projected that this site can be released from the license by 1993.

Cabot Corp., Revere Pa

1. Site Identification

Cabot Corporation  
Revere, Pennsylvania  
Docket No. 040-06940  
NRC Project Manager: J. Swift

2. Site Description

The site is located in eastern Pennsylvania, between Philadelphia and Allentown. Cabot processed ores and slags at the site to extract tantalum and columbium. Natural uranium and thorium were present in the ores and slags in sufficient concentration to require a source material license. No source material processing has occurred at the site in several years, and Cabot does not plan any more in the future.

3. Description of Wastes

Trace quantities of natural thorium and uranium.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The licensee says that the site is decontaminated.

5. Financial Assurance/Viable Responsible Organization

Cabot Corporation owns the site and is currently under license. Cabot is a large company with the resources to decontaminate the site.

6. Status of the Decommissioning Activities

The site has been decontaminated by the licensee.

Four 55-gallon drums of radioactive waste removed to Cabot's Boyertown facility in 1974. Cabot claims the site is decontaminated, but no confirmatory survey has been performed. The licensee has been notified that they need to do a confirmatory survey. They will inform NRC by letter when this will be accomplished.

7. NRC Actions Needed and Timing

The NRC will have a confirmatory survey performed after the licensee performs their confirmatory survey. If the licensee's survey results are satisfactory, NRC's survey can be completed by September 1990. Release of the site from the license could occur by December 1990; however, if excessive contamination is found on the site (common in such cases) the process could continue into 1992.

Chemetron Corp., Bert Ave.

1. Site Identification

Chemetron  
Newburgh Heights (Bert Avenue), Ohio  
Docket No. 040-08724  
NRC Project Manager: J. Swift

2. Site Description

This site is located in an industrial part of suburban Cleveland and occupies about seven acres. This is known as the Bert Avenue site, or the dump site, to distinguish it from Chemetron's other site nearby on Harvard Avenue in Newburgh Heights. The Village of Newburgh Heights would like to build a storm sewer through this site. Upon dismantling and decontaminating buildings on the Harvard Avenue site some of the material contaminated with depleted uranium ( $U_{38}$ ) disposed of in the Bert Avenue dump in 1975.

3. Description of Wastes

Portions of the site were contaminated with depleted uranium, antimony oxide slag containing natural uranium, and fly ash and fire brick containing natural uranium and thorium with daughters. A confirmatory survey was performed by ORAU in October 1985. The ORAU survey showed that soil samples concentrations ranged from: U-238, less than 0.5 to 170 pCi/g; Th-232, less than 0.1 to 3.5 pCi/g; and Ra-226, 0.3 to 1973 pCi/g.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public as it is fenced off and patrolled daily.

5. Financial Assurance/Viable Responsible Organization

The site is owned by McGean-Rohco, Inc. of Cleveland, Ohio. The license is held by Chemetron Corporation of Pittsburgh, PA. Chemetron has committed to cleaning up the site even though the company is in Chapter 11 bankruptcy.

6. Status of the Decommissioning Activities

Chemetron will be using the same contractors for the Bert Avenue site that have been decontaminating the Harvard Avenue site. To date, we have been satisfied with the contractors' methods at the Harvard Avenue site.

Chemetron's consultant has begun surveying the site preliminary to devising a decontamination plan. Once the site has been surveyed, a decontamination plan will be submitted by the end of March 1990.

7. NRC Actions Needed and Timing

This license was extended to October 31, 1990, with the conditions, (1) that the licensee shall submit their plan for the decontamination of this site by March 30, 1990; (2) that the licensee shall decontaminate the site and submit the results of a survey and an evaluation as a basis for a request for unrestricted release of this site by October 31, 1990. The decontamination plan will have to be reviewed and accepted by NRC. Upon receipt of the request for unrestricted release, the NRC will have a confirmatory survey performed prior to termination of the license. License termination is projected for December 1990.

Chemetron Corp, Harvard Ave

1. Site Identification

Chemetron Corporation  
Newburgh Heights (Harvard Avenue), OH  
Docket No. 040-08724  
NRC Project Manager: J. Swift

2. Site Description

This site is located in an industrial part of suburban Cleveland. This is known as the Harvard Avenue site to distinguish it from Chemetron's other site nearby on Bert Avenue in Newburgh Heights. A contaminated building has been demolished. About three acres of the site was contaminated, of which about one acre was released for unrestricted use on October 1, 1987. Chemetron produced  $U_{308}$  from  $UF_6$  and subsequently used the  $U_{308}$  in the manufacture of a catalyst. In June 1978 Chemetron removed all the uranium under license from the site and began decontamination of the facility.

3. Description of Wastes

About two acres of the soil was contaminated with depleted uranium.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. It is about 90 percent decontaminated and access to the site is controlled.

5. Financial Assurance/Viable Responsible Organization

The site is owned by McGean-Rohco, Inc. of Cleveland Ohio. The licensee is the Chemetron Corporation of Pittsburgh, Pennsylvania. Chemetron has committed to cleaning up the site even though the company is in Chapter 11 bankruptcy.

6. Status of the Decommissioning Activities

Presently, small but deep pockets of contamination above the 35 pCi/g still have not been decontaminated. Once pathway analysis is completed, Chemetron will complete decontamination and request release of the site from the license.

Chemetron is presently doing pathway analysis, and may request leaving in place small volumes with higher levels of radionuclides than allowed by in the Branch Technical Position. Chemetron has shipped over 17,000 ft<sup>3</sup> of contaminated soil and rubble to Barnwell. Chemetron has performed field work for pathway analysis. Laboratory analysis will be completed by end of February 1990.

7. NRC Actions Needed and Timing

The license was extended to October 31, 1990, with the conditions that the licensee shall submit by March 30, 1990: (1) the result of a pathway analysis; (2) their method for completing decontamination; (3) their schedule for completing the decontamination of the site and the licensee shall also (4) submit the results of a survey and an evaluation as a basis for a request for unrestricted release of the site by June 29, 1990. NRC will have to approve the plan for the remainder of contaminated pockets.

Upon receipt of the request for unrestricted release, the NRC will have a confirmatory survey performed prior to releasing the site. License termination is projected for December 1990.

## Dow Chemical

### 1. Site Identification

Dow Chemical Company  
Midland, MI

License No. STB-527  
Docket No. 040-00017

NRC Project Manager: Bruce Mallett, Region III

### 2. Site Description

The Dow Chemical Company was granted License No. C-2782 by the AEC in 1956 to use thorium metal and compounds for the production of thorium-magnesium alloys. In 1962 the AEC issued Dow a new license encompassing operations at three locations -- Midland, MI, Bay City, MI, and Madison, IL. In 1973 the license was amended to authorize only the storage at Midland, Bay City, and Madison or transfer of metal or process sludge to authorized recipients. These licensed operations resulted in the production of a slag material and contaminated soil containing thorium that require disposal.

The Dow site in Madison, IL was sold in 1971 to Phelps Dodge Aluminum Corporation which later merged with Consolidated Aluminum Corporation. The material at Madison was transferred to the Consolidated Aluminum Corporation pursuant to License No. STB-1097 (Docket No. 40-8088).

Waste materials and contaminated soil are being stored at the Midland and Bay City sites. The Bay City site also includes some contaminated material previously transferred there from a site where similar operations took place by the Wellman Dynamics Corporation. Dow proposed to dispose of this material in their Salzburg hazardous waste landfill located in Midland, MI.

#### Bay City Site

The Bay City site is located about 1 mile south of Saginaw Bay and is about 20 mi east of the Salzburg landfill. The contaminated material is stored on a fenced-in Dow-owned site that is controlled by Dow security staff. Another storage area (75 ft by 150 ft) used for the storage of some additional contaminated materials from the Wellman site is roped off and posted. Approximately 3,890 cubic yards of contaminated materials were initially estimated to be stored at the Bay City site. In the Dow disposal application submitted to the NRC on October 30, 1989, Dow revised this estimate to be 40,000 cubic yards of material requiring disposal.

Hydrologic data for the Bay City site is available and indicates that the primary groundwater flow direction is southwesterly toward an inlet canal that leads to a pumping station and Saginaw Bay. Groundwater under a

small portion of the site flows in a northeasterly direction toward Saginaw Bay. There are several monitoring wells around the site. Data

from 96 well samples taken by Dow during 1985 show gross alpha levels between less than 2.5 and 17 pCi/l and gross beta levels between 8 and 1,758 pCi/l. Sample data are also available from surface waters and wells from 1970 and show activity levels less 1 pCi/gm. Sampling performed by Region III staff in 1979 indicated gross alpha activity up to a maximum of 4 pCi/l in six samples taken from wells, the canal, and ponds. Sample data taken from monitoring wells in 1985 by Region III staff during an NRC inspection indicate thorium activity levels at background to 1.25 pCi/l. More recent sampling data are unavailable.

#### Midland Site

Between 3,000 and 5,000 cubic yards of thorium slag material were initially estimated to be at the Midland site. In the Dow disposal application submitted to the NRC on October 30, 1989 Dow revised its volume estimate to be 12,000 cubic yards. The 160 ft by 300 ft Midland site is roped off and the contaminated material is covered by a 1 to 2 ft clay cap. Hydrologic information for the Midland site is unavailable in the licensing files. However, some water sampling data are available. Data from 28 grab samples from the Tittabawassee River, which flows adjacent to the storage site, were taken above and below the plant in 1967 and show gross beta levels ranging from 2.6 to 16.3 pCi/l. An NRC sample of sludge taken in 1983 from Shot Pond had a Th-232 activity of 2 pCi/gm. More recent sampling data are unavailable.

#### Site History

In March 1979 Dow compared several methods for the disposal of these magnesium-thorium slag piles. They concluded that temporary storage in the existing configuration would be the best alternative until the State of Michigan can develop a disposal facility for these materials in accordance with NRC requirements.

In October 1979 the NRC requested that Dow provide a comprehensive plan for removal and disposal of the thorium-magnesium wastes. In February 1980 Dow agreed to provide site information, but continued to state that the wastes should remain in storage and not be removed. Site information was submitted to the NRC in August 1981.

In August 1981 Dow requested that the Midland site license be terminated based on survey results that indicated that the radioactivity levels met NRC guidelines for unrestricted release. At the same time Dow also informed the NRC that the Bay City site slag storage pile had an average thorium concentration of 1,700 pCi/gm. This pile had been graded and compressed to 2.5 ft deep and covered with a tar-based road sealant in



1978. Groundwater monitoring wells had been installed around the site and a 7 ft chainlink fence had been installed to secure the site.

In June 1982 NRC Region III staff performed contamination surveys at the Midland site. The results of this survey indicated that contamination still existed above NRC guidelines. Region III staff recommended that the site not be released for unrestricted use until the contaminated material is disposed and a confirmatory survey is performed by ORAU.

In August 1982 NRC Region III staff documented that contaminated soil and debris had been removed from the Wellman Foundry site in Bay City to the Dow storage site in Bay City. The Wellman Foundry site was the original Dow operation at Bay City, MI licensed by the AEC in 1956. In 1961 Wellman Bronze and Aluminum Company (later the Wellman Dynamics Corporation) took over the Bay City operations. Wellman was licensed by the AEC (License No. STB-136) to manufacture magnesium-thorium castings. Wellman's operations involved casting, sandblasting, sawing, grinding, sanding, and polishing thorium aluminum alloys.

In 1972 Wellman requested that their license be terminated and the site released for unrestricted use. The termination survey performed by Wellman indicated that a considerable amount of contaminated material remained in three buildings. This material, however, had been either transferred to Wellman's licensed facility in Creston, IA or buried in accordance with 10 CFR 20.304 and an agreement with the State of Michigan. The license was terminated in May 1972 and the site reverted back to Dow, who sold the property in 1974 to the Dore Wrecking Company (now Dore Enterprises, Inc.).

In May 1982 NRC Region III staff conducted an inspection of the Wellman site to verify that previously licensed material had been removed and the area had been decontaminated to meet NRC unrestricted release criteria. This inspection was performed after a review of 16,230 formerly licensed sites identified twelve sites, including the Wellman site, to require further evaluation to ensure that the sites had been properly cleaned up. This review of formerly licensed sites was performed because of recommendations made by GAO in 1976.

Substantial contamination was found in or around five buildings. These areas were subsequently decontaminated and about 1,570 cubic yards of soil material removed to Dow's Bay City thorium storage site located two miles from the Wellman site. In August 1984 ORAU performed a confirmatory survey but found additional contamination. Dow performed further decontamination and in November 1985 ORAU performed a second survey verifying that the site met NRC release criteria. These criteria required that soil contamination be less than 10 pCi/gm and have an exposure rate of less than 10 uR/hr above background at 1 m. Based on the ORAU survey the NRC released the site for unrestricted release in March 1987.

In 1982 Dow submitted a decommissioning plan for the Midland site. This plan proposed transferring all the contaminated material to the Bay City site. In 1987 Dow proposed moving the contaminated material at both the Midland and Bay City sites to the Salzburg landfill on Salzburg Avenue in Midland. In December 1987 Dow submitted a relocation/decommissioning plan that proposed a temporary relocation of the contaminated material at the Midland site 1,000 ft east of its current location so that an adjacent diversion basin could be cleaned up to meet a RCRA closure schedule. Dow had proposed an aggressive cleanup schedule and requested a timely response from those agencies having regulatory jurisdiction. The licensee subsequently performed a radiological survey that depicted an outline of the area containing the radioactive material. This enabled Dow to physically separate the radioactive material from the RCRA material by installing sheet piling. This enabled Dow to clean up the diversion basin without having to move the radioactively contaminated material.

In January 1988 a draft 10 CFR 20.302 license application was provided for comment to the NRC and the State of Michigan. In October 1989 Dow submitted an application for the disposal of the Midland and Bay City contaminated material at the Salzburg landfill. This application is currently under review.

### Salzburg Site

The Salzburg landfill is a 152 acre site owned by Dow that is fully permitted for hazardous and non-hazardous wastes. It is located in Midland, MI 1.5 mi from the Midland site and 20 mi from the Bay City site. The site has an average 4 ft thick sand layer overlaying 14 to 24 ft of lakebed clay and an average of 125 ft of glacial clay. The regional aquifer is 0 - 50 ft thick at a depth of 120 ft below grade. There are no usable sources of groundwater beneath the proposed waste disposal cell designated for radioactive waste disposal. Three private residences with wells are located 130 - 400 ft east of the disposal cell. The private wells are at depths of 35 - 155 ft. There are 16 shallow monitoring wells around the disposal cell. These monitoring wells are required under RCRA and Michigan hazardous waste requirements. Groundwater monitoring wells and domestic wells are sampled as part of the disposal site monitoring program. No radioactive contamination in these wells has been detected.

The proposed cell design for the thorium wastes includes a 3 ft recompacted clay underliner, a 1 ft sand drainage layer, 5 ft of recompacted clay, a 100 mil HDPE synthetic liner, a 1 ft sand leachate drainage layer, 24 ft of waste, a 100 mil HDPE synthetic liner, a 3 ft clay cap covered with 2 ft of top soil. No liquid waste is allowed to be disposed at the Salzburg site.

### 3. Description of Wastes

The contaminated material in the Bay City storage area was initially estimated to consist of about 3,890 cubic yards of insoluble slag material and soil with activities up to 1,700 pCi/gm. In the Dow disposal application submitted to the NRC in October 1989, Dow conservatively estimated the total volume of contaminated material at the Bay City site to be 40,000 cubic yards. In 1978 Dow performed a leaching study of the slag material and concluded that even under aggressive conditions the waste would leach at very low rates. The average activity is about 1,000 pCi/gm. Exposure rates above the pile are up to 8.4 mR/hr. Some of this material (1,570 cubic yards averaging about 60 pCi/gm) were transferred from the Wellman site. There are about 3.5 Ci and 69,000 lb of thorium in the material.

The Midland site was initially estimated to contain between 3,000 and 5,000 cubic yards of contaminated soil and slag similar to that at the Bay City site. In the Dow disposal application submitted to the NRC in October 1989, Dow conservatively estimated the total volume of contaminated material at the Midland site to be 12,000 cubic yards. The activity in the contaminated material varies substantially and ranges up to 2,000 pCi/gm. Approximately 0.46 Ci of Th-232 are in this material.

#### **4. Description of the Radiologic Hazard**

The principal hazards associated with the contamination at the Midland and Bay City sites involve direct exposure, inhalation, ingestion, intrusion, and groundwater. No immediate threat to public health and safety exists at either location. The direct exposure, inhalation, and ingestion hazards are low because the storage areas are covered (by an asphalt cover at the Bay City site and a 1-2 ft clay cover at the Midland site). In 1978 Dow performed a study to determine the respirable fraction of the slag material. The respirable fraction was determined to be less than 0.1 percent. Of this fraction about 1.5 percent would be thorium. Both sites are within property protected by Dow security so intrusion hazards are minimized. Groundwater sampling data indicate that there is minimal contamination. Because of the insoluble nature of the waste material, it is expected that the groundwater hazard will remain low.

#### **5. Financial Assurance Required and Responsible Organization**

The possession limits for the Dow license are source material not to exceed 200,000 lb as metal or process sludge, 1,000 lb as an oxide or flouride, and 300 lb as compounds. The current license expired on March 31, 1978 and has been on timely renewal ever since.

Because Dow possesses greater than 100 mCi of thorium, it would have to provide under the 1988 decommissioning rule a financial certification for \$750,000 by July 27, 1990 and a decommissioning funding plan at its next renewal. The Dow Chemical Company is a very large organization that is

expected to remain viable and be capable of providing the financial resources to cleanup both the Bay City and Midland sites.

6. Status of the Decontamination Activities

On October 30, 1989 Dow submitted a 10 CFR 20.302 disposal application to the NRC for disposal of the Bay City and Midland wastes at the Salzburg landfill. The NRC is currently reviewing this application. Dow is keeping Federal, State, and local authorities informed of their proposed activities.

7. NRC Actions and Timing

The NRC/NMSS needs to review the Dow disposal plan. This review will be based on current 10 CFR 20.302 criteria and is scheduled to be completed by June 1990.

The NRC/NMSS must also resolve the issue of disposing of radioactive wastes at the same site used for the disposal of RCRA hazardous wastes. A meeting between IMNS, LLWM, and Region III staff will be held by May 1990 to develop an NRC position. The NRC will then meet with State of Michigan and EPA staff in July 1990 to resolve this matter after the technical review of the disposal plan is completed.

The licensee plans to begin construction of the disposal cell at Salzburg in 1991 and complete construction by 1992. Disposal of Bay City and Midland wastes should begin in late 1992 or early 1993. The licensee's final surveys of the Bay City and Midland sites should be completed by the summer of 1993.

NRC/Region III will perform a final survey with ORAU in the summer of 1993. Subsequently, the license could be terminated by late 1993 or early 1994.

Fansteel, Inc.

1. Site Identification

Fansteel, Inc.  
Muskogee Plant  
Muskogee, Oklahoma  
Docket No. 040-7580  
NRC Project Manager: J. Swift

2. Site Description

The facility is located on approximately 110 acres in Muskogee County, Oklahoma, northeast of the city of Muskogee adjacent to an interstate highway and on the bank of the Arkansas River. Tin slags, ores, and ore concentrates were received and processed for the tantalum and columbium values. The natural uranium and thorium contained in the feed materials remain in the process residues. Historically, in the feed materials, the natural thorium content exceeded the natural uranium content. However, during the final years of operation, this relationship was reversed because of Fansteel's increased dependence on tin slags and ore concentrates as feed materials.

3. Description of Wastes

A single process building and liquid waste treatment facility are contaminated with small quantities of natural uranium and thorium. Most of the natural uranium and thorium is found in the form of undissolved solid residues deposited in several settling ponds. Prior to September 1979, a large portion of these residues were collected in Pond 2 which is covered with plastic sheets and 6 to 12 inches of soil. Pond 3 was utilized for the collection of residues until the pond's liner failed in mid-1980. Following that time, the residues were collected by filtration or mechanical separation and stored in lined drums.

The total quantities of natural uranium and thorium in Ponds 2 and 3 and several other clarification ponds are estimated to be 23,000 kilograms (25.4 tons) and 59,000 kilograms (65.0 tons), respectively.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The only substantial contamination outside of the settling ponds is low-solubility natural uranium and thorium in low concentrations in the soil.

5. Financial Assurance/Viable Responsible Organization

The site is owned by Fansteel, Inc., and all licensed activities are conducted by Fansteel. Fansteel, Inc. has the resources and accepts the responsibility for site cleanup.

6. Status of the Decommissioning Activities

Fansteel ceased processing of feed materials containing natural uranium and thorium at the end of 1989. No decommissioning plan has been submitted for NRC approval. Recently, the Fansteel license was revised in its entirety and requires, in part, the submittal of a decommissioning plan by August 1990. Fansteel has indicated that the contaminated residues will be processed at their existing facility for transfer to another facility. Fansteel has stated that these residues contain quantities of tantalum which will be recovered at the other facility. This facility most likely will be outside the United States. Since the pond liner failure in 1989, Fansteel has been negotiating site cleanup with EPA's Region 6.

Currently, Fansteel is de-watering the residues in Pond 3 to eliminate any free-standing liquids.

7. NRC Actions Needed and Timing

Although the Fansteel license was recently revised, it remains under timely renewal. Within a few months, staff will further amend the license in responses to expected licensee requests to change operations to the recovery and shipping of pond sludges. Staff aims to achieve agreement on a decommissioning plan in 1990.

Gulf United Nuclear Fuels Corp.

1. Site Identification

Gulf United Nuclear Fuels Corporation  
Pawling, New York  
Docket No. 70-903  
NRC Project Manager: J. Swift

2. Site Description

The 1137 acre site is located in a wooded, rural area of Dutchess County, New York, about equidistant between Poughkeepsie and Danbury, Connecticut. The site includes a dammed lake of about 50 acres. There are a former plutonium fuels development laboratory, a critical reactor assembly building, and outbuildings on the site. All activities were discontinued in 1973. The site now contains a portion of the Appalachian Trail.

3. Description of Wastes

Although the site had been decontaminated and apparently met regulatory guidelines in the mid-1970's, some fixed plutonium contamination in excess of the guidelines has been found in the plutonium fuels development laboratory in a 1986 survey by a National Park Service contractor. In the same survey, a few samples in excess of guidelines were found in soil outside of one wall of the laboratory. The total volume of soil involved may be limited to tens of cubic feet. The form of the plutonium has not been determined.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The only known contamination is in several small areas inside the plutonium fuels development laboratory and in one area of soil outside the laboratory where measurable levels of plutonium have been found. The site is under the control of the National Park Service, the former licensee's license having been terminated in 1975.

5. Financial Assurance/Viable Responsible Organization

The site is owned by the U.S. Department of the Interior, National Park Service, who acquired it in 1979 from Harpoon, Inc., who in turn acquired it in 1977 from United Nuclear Corp., the owner while Gulf United Nuclear Fuels Corp. operated and decommissioned the site.

6. Status of the Decommissioning Activities

There are no current plans for decontamination.

The National Park Service and NRC met in September 1989 to review the status of the Pawling site. The NRC agreed to explore with the former licensee and former owner the possibility of additional actions to characterize and remediate residual contamination at the site.

7. NRC Actions Needed and Timing

NRC has sent General Atomics, the partial successor company to the former licensee, background information on the recent history of the Pawling site preparatory to a meeting to discuss General Atomics' and Gulf Oil Company's responsibilities and possible actions. A telephone conference was held February 14, 1990, between NRC staff and representatives of Chevron, General Atomics, and Valley Pines Associates to discuss the residual contamination and residual responsibility of the parties. Further discussions will be held in early March.



## GSA-Watertown Site

### 1. Site Identification

GSA-Watertown Arsenal Site  
General Services Administration, Region I  
John W. McCormack Post Office and Courthouse  
Boston, MA 02109

No License

Site Location: Arsenal Street  
Watertown, MA

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

The Watertown Arsenal complex is composed of 2 separate tracts of land located along the north branch of the Charles River approximately 5 miles west of Boston, Massachusetts. The main facility tract extends west along Arsenal Street approximately 1.2 miles from the intersection of Arsenal Street and Charles River Road. The main entrance is on Arsenal Street approximately 0.6 miles west of this intersection. At the main entrance a roadway runs south, from Arsenal Street, bisecting the facility and connecting with the intersection of North Beacon Street and Charles River Rd., which forms the southern facility boundary. The area east of the main entrance was released by the Army sometime after 1967 and is now owned by the Watertown Redevelopment Authority while the area to the west remains under U.S. Army control.

The second tract is 12 acres located north of Arsenal Street, just northeast of the main complex, between Greenough Boulevard on the east and Coolidge Avenue to the west. This section extends north along Greenough Boulevard approximately 1750 feet and west along Arsenal Street approximately 800 feet. This area is called the "GSA site".

Beginning in 1946 work involving radioactive materials was conducted at various locations within the Watertown Arsenal complex. In 1946 the Massachusetts Institute of Technology (MIT) moved a research program on African ore to Building 421 of the Watertown Arsenal (now in the Redevelopment Authority area) for the Manhattan Engineering District (MED). In 1951 American Cyanamid took over responsibility for these operations from MIT and the U.S. Army determined that it needed the space being occupied by the AEC operations. As a result, in 1953, the AEC transferred these operations to another laboratory in Winchester, MA.

Other areas in the arsenal complex were involved in depleted uranium operations during the MED/AEC era; however, they were apparently used only by the U.S. Army. In the area east of the main gate, Building 34 housed a

uranium machine shop, a portion of Building 41 contained a foundry that was used for uranium work, and Building 421 was used for uranium processing. The area now occupied by the General Services Administration (GSA) (the GSA site) was used for packaging and storing radioactive waste, burning uranium scrap, and staging radioactive waste shipments. Army operations involving depleted uranium continued under license in these areas of the arsenal until June 1967, when responsibility for the area was transferred, along with the AEC source materials license SUB-238, to the Army Materials Research Agency (now the Army Materials and Mechanics Research Center). The area east of the main gate, including the sites of Buildings 34, 41 and 421, and the now GSA site were subsequently excised. NRC licensed uranium and thorium operations (alloy fabrication and utilization for research, development, and prototype testing of depleted uranium specimens, projectiles, or penetrators) are still conducted at the Arsenal in the area west of the main gate.

Only a concrete pad remains from Building 421. The disposition of the building rubble is unknown. A portion of the pad is now used for storage of concrete vaults, a park and two tennis courts.

Buildings 34 and 41 were razed sometime after release by the Army in 1969, and only the concrete floor slabs, access driveways, and underground utility service trenches remain. During the early 1980's, these areas were used as parking lots. The entire area is gradually being converted to sites for rental living units and commercial business use.

The GSA area, north of Arsenal Street, is being used by a number of Federal agencies. The property includes several buildings being used for storage, equipment maintenance, and a pistol firing range. An outdoor fenced area is used for the storage of excess Federal vehicles. Only a small concrete pad remains at the site of the original MED/AEC operations. This area is fenced.

The DOE reviewed historical records regarding the site and investigated to determine if DOE has authority to conduct remedial action at the arsenal in the last 1970's and early 1980's. On the basis of the available data, in April 1986 the DOE determined that there was not sufficient information to provide DOE authority under the Atomic Energy Act to perform cleanup activities and eliminated this site from FUSRAP consideration. The DOE notified NRC, EPA and the Commonwealth of Massachusetts of these findings.

DOE found no records to indicate whether the AEC or the Army ever surveyed Building 421 prior to its release and demolition. Records found by DOE indicated buildings 34 and 41 and the GSA area were surveyed in 1967 and found to be contaminated in excess of the prescribed criteria for uncontrolled release. Buildings 34 and 41 were to be decontaminated and surveyed by Isotopes, Inc., prior to their transfer to GSA and ultimately to the Watertown Redevelopment Authority. The Army was to perform independent verification surveys. Apparently, these activities were

completed and the buildings released to GSA for unrestricted use, but records of these actions were not found by DOE.

The GSA area was transferred to GSA in a contaminated condition. Prior to transfer some decontamination was performed. According to some available records, the radiation levels met the guidelines for unrestricted use except for some areas on the concrete pad and the surrounding soil.

No specific information on the hydrology of the site is available. However, the site is adjacent to the Charles River. Water was sampled in 1977 in natural surface drainage areas, in storm drains, and in floor drain openings in the concrete pads. There was no indication of contamination above background levels except in some concrete pad floor drains. Recent water sampling data is unavailable. There are no monitoring wells installed at the site.

### 3. Description of Wastes

In a report dated 1980, ANL found during direct instrument surveys of the pad of Building 421 and the south wall of Building 331 (nearest building to the pad) three small spots of radioactive contamination that exceeded DOE FUSRAP guidelines. Smears indicated that the contamination was fixed, and the analysis of one sample identified the contamination as natural uranium. Other direct instrument measurements showed no readings above natural background. Analyses of soil and water samples and measurements of radon in the air gave no indications of levels above background. One Building 41 concrete pad floor drain sludge sample and the suspended solids from a water sample showed slightly elevated levels of uranium (5.8 - 12.0 pCi/gm).

During the ANL radiologic assessment of the Building 421 site, Buildings 34 and 41 and the GSA site were identified as areas also involved in uranium operations during the AEC era. At that time, no determination could be made as to whether they were part of the MED or AEC work. However, ANL reports state that license records and additional record searches indicate that the work in these areas was Army-related.

In 1981 ANL surveyed Buildings 34 and 41 and the GSA site. Levels of contamination in excess of the DOE FUSRAP guidelines were measured at both Building 34 and the GSA site.

Soil concentrations at the GSA site were as high as 26,000 pCi/gm in one location and several thousand pCi/gm in several other locations. The average soil activity concentration is estimated to be 240 pCi/gm and the radiation exposure rates are about 20 - 30 uR/hr. Contamination reached to a depth of 6 ft in some places. The total volume of contaminated soil may be as large as 12 m<sup>3</sup>. The buildings at the GSA site were found to be free of radisual radioactivity. In November 1986 the NRC conducted a

confirmation survey in the GSA area and determined that no changes in the activity levels had occurred since the ANL investigations.

At the Building 34 site, soil contaminated just slightly in excess of Option 1 of the Branch Technical Position was found. In addition, 33 spots of fixed uranium contamination were found on the concrete pad. The highest was 7 mR/hr at the concrete surface. The volume of contaminated concrete has not been estimated.

No contamination was found on the Building 41 pad; however, two-thirds of the concrete pad was covered with soil up to 4 ft thick. One of the soil corings taken adjacent to the Building 41 pad had slightly elevated levels of uranium.

4. Description of the Radiologic Hazard

The principal hazards associated with the contamination at the GSA Watertown Arsenal site involve inhalation, ingestion, intrusion, and groundwater. No immediate threats to public health and safety exist due to the relatively low concentrations and small amount of uranium on the site. There are only small amounts of uranium on the site. The migration potential to groundwater systems is expected to be small. This is confirmed by the groundwater sample analyses performed by ANL in 1977. Since the soil contamination has not been stabilized there is some potential for migration through erosion or blowing wind. However, because access to the most contaminated areas of the site is restricted there is little potential for intrusion. No airborne contamination levels above background were found in the ANL survey.

5. Financial Assurance Required and Responsible Organization

Since there is no license there are no possession limits established for the site. These possession limits would need to be established in the review of a license application. The site is under the control of the Federal government; therefore, GSA would be expected to establish financial assurance through the use of a Statement of Intent.

6. Status of the Decontamination Activities

On October 15, 1986 NRC requested GSA to apply for a license to cover possession of the contaminated site until release requirements were met and submit a decontamination plan. Subsequently, NRC agreed that a license was unnecessary since GSA agreed to perform the needed cleanup. The cleanup criteria to be used is Option 1 of the 1981 Branch Technical Position.

In 1988 GSA contracted with Chem-Nuclear Systems, Inc. to decontaminate the site and began the decontamination operations. A high water table limited activities that year. Decontamination resumed in 1989, but the

discovery of an underground petroleum storage tank limited further activities. The GSA is currently developing plans to remove the tank in compliance with EPA regulations. Decontamination is expected to resume in 1990.

7. NRC Actions Needed and Timing

The NRC needs to monitor the GSA area cleanup activities being performed and conduct a final survey when the decontamination is completed.

The NRC also needs to review the contaminated areas at the Building 421, 34, and 41 sites to determine whether these areas need additional remedial action. This will be accomplished by review of Army records during the renewal of the Army license at Watertown Arsenal which is scheduled for 1990 and during a site visit in 1990.

The NRC actions will be:

	<u>Date</u>
1. Inspect GSA cleanup activities	<u>1990</u>
2. Visit Building 421, 34, and 41 sites	<u>1990</u>
3. Review Army disposition of area east of access road	<u>during renewal of Army License (1990-91)</u>
4. Review GSA close-out survey data	<u>when available</u>
5. Perform NRC final survey	<u>TBD</u>
6. Document completion of cleanup and final survey	<u>TBD</u>

## Heritage Minerals

### 1. Site Identification

Heritage Minerals  
Lakehurst, NJ

License No. (NEW APPLICATION)  
Docket No. 040-08980

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

Heritage Minerals processes stockpiled mineral sands which were left behind as tailings from a previous mining operation. The mineral sands are processed to separate the economically valuable minerals, zircon and leucoxene (titanium oxide).

The stockpiled sand (also referred to as New Feed) which is the raw material for Heritage's plant is a mixture of naturally occurring materials, silica sand (about 70%), aluminum silicate minerals (15%), zircon, and leucoxene, and a trace amount of monazite sand (0.5%). The monazite is a complex phosphate of rare earth elements containing about 3.5% thorium and uranium chemically bound with the rare earth phosphates. Monazite is the only known source of thorium and uranium in the sand.

The plant processes the New Feed to extract the zircon and leucoxene for commercial purposes; the remaining portion is returned to a tailings area.

The Heritage Minerals site consists of 7,000 acres of which 1000-1200 has been involved in the mining operation. The plant, including the tailings piles, occupies about 500 acres. The current operation at the site has been conducted by Heritage since 1987. In November, 1986 the stock of new feed was about 1.2-1.6 million short tons, of which about 250,000-300,000 remains.

The New Feed will be exhausted in the near future. Current plans are to reprocess the material in the tailings area which will take about another three years. It is intended that the monazite (containing the thorium and uranium) will be isolated, sold and transferred to other licensees in the form of a sand product.

In 1989, NRC informed Heritage that they were in possession of source materials in excess of quantities required to be licensed under 10 CFR 40 and directed Heritage to apply for an NRC license. Subsequently, Heritage submitted a license application to NRC (see below).

The Heritage site is located on the Atlantic Coastal Plain. The formations are sandy and permeable to at least 1500 feet, where some clay is encountered, and bedrock is not encountered until at least 3000 feet. The

### 3. Description of Wastes

As noted above, the monazite sand is the material containing the source material, thorium and uranium. The monazite is in the New Feed, the source material is concentrated during the extraction processing, and the monazite is sent to the tailings pile.

uppermost aquifer at the site is the Cohansey. Depth below grade to the seasonal high water of this aquifer is about six feet. The current owner proposes a housing development for the site following operations and is awaiting various state and local permits. Development of the present plant location would take place last; the entire project is expected to last 20 years.

At the time of the NRC inspection in January 1989, analysis of the tailings indicated that there was approximately 62 tons each of uranium and thorium in the tailings piles. The analysis showed that the table concentrate had a source material concentration of 0.074% and the monazite waste has a source material concentration of 0.585%. Based on the analysis, NRC informed Heritage that it was in apparent violation of 10 CFR 40.3 (which has source material licensing levels of 0.05%), and directed it to submit an application for license.

Radiation readings were taken at the NRC inspection. Background levels were observed to be 7 uR/hr. Ambient levels at the dry mill building were 50 uR/hr; in the area of the dry mill feed were 300 uR/hr; in the area of the dry mill tailings discharge were 240 uR/hr, and over the tailings pile were 30 uR/hr.

As noted above, it is planned that the monazite (containing the thorium and uranium) in the tailings pile will be isolated, sold and transferred to other licensees. The tailings product left behind on-site will then contain less than 0.005% combined source material (Th and U) and would then meet the NRC Branch Technical Position on Onsite Disposal of Thorium or Uranium Wastes from Past Operations (46 FR 52061)

### 4. Description of Radiologic Hazard

There is no immediate threat. Maximum radiation levels of 300 uR/hr were measured in the dry tailings pile. Source material is not chemically altered by the process and appears to be stable and not to become airborne. Little dust was observed during the NRC inspection; only in limited areas in the dry mill can material become airborne and workers in those areas wore dust masks.

Four groundwater samples were analyzed by the licensee and showed no radioactive contamination of groundwater occurred as a result of operations.

The NRC inspection indicated that an option for correcting the problem discovered at Heritage was for Heritage to submit an application for an NRC license; Heritage has done this and the application is in NRC review.

The material that Heritage states will be ultimately left onsite is indicated as potentially qualifying for Option 1 of the Branch Technical Position described above.

5. Financial Assurance/Viable Responsible Organization

Decommissioning funding information is required as part of the license application. The licensee has submitted a decommissioning funding plan as part of its application for a license; this plan is being reviewed by NRC. The cost estimate is small and depends on the licensee having shipped away all source material during operations.

Heritage has submitted a license application in response to the NRC directive and indicated that it would cooperate fully in ensuring that its operation is in full compliance with NRC regulations.

6. Status of Decommissioning Activities

On March 22, 1989, Heritage submitted a license application for source material that was previously unlicensed. This was done in response to an NRC directive that this would be an option for correcting this violation. This application, including the decommissioning funding plan, is under review by the NRC.

The facility is in operation and there are no plans to decontaminate it at this time.

Heritage has stated that all licensable source material will be shipped away from the site during operations and that material onsite at shutdown will qualify for Option 1 of the NRC technical position on uranium and thorium wastes.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

- |   | <u>Date</u>           |
|---|-----------------------|
| 1. Review the license application submitted by the applicant including the decommissioning funding plan | <u>June 1990</u>      |
| 2. Determine if additional cleanup of the site or license condition is needed at this time              | <u>September 1990</u> |



- |  |                       |
|--|-----------------------|
| 3. If added cleanup is not need, remove site from list of sites              | <u>December 1990</u>  |
| 4. If added cleanup is needed, review and approve decontamination            | <u>June 1991</u>      |
| 5. Inspect implementation of decontamination plan                            | <u>December 1991</u>  |
| 6. Perform NRC survey of area being decontaminated and remove site from list | <u>September 1992</u> |

8. Potential problems inhibiting site cleanup

None at this time

## Kawkawlin Landfill

### 1. Site Identification

Waste Management, Inc.  
Kawkawlin Landfill  
Bay City, MI

No License

NRC Project Manager: Bruce Mallett, Region III

### 2. Site Description

In May 1983 the Michigan Division of Radiological Health informed NRC/Region III that radioactive material was found in the SCA Services, Inc. landfill (formerly owned by Hartley and Hartley and now owned by Waste Management, Inc.). This landfill is located in the town of Kawkawlin, MI. Contamination was also found on adjacent property owned by the Michigan Department of Natural Resources (MDNR). The material was identified as Th-232 and its daughter products. It was believed that this material had come from an NRC licensed activity. The material also contained magnesium. The Dow Chemical Company and Wellman Dynamics Corporation were two local organizations known to have used similar material. The State of Michigan requested an investigation to determine if an NRC licensee was involved in the disposal of the material.

The Kawkawlin landfill and the adjacent MDNR property are located in the Tobico Marsh Game Area north of Kawkawlin, MI, which is northeast of Bay City, MI. In 1962 it was discovered that the area, owned by a waste handler, Hartley and Hartley, was being used as a landfill and some of the waste was also disposed of on the adjacent MDNR property. Based on a magnetometer survey the State of Michigan estimated that 18,500 drums were buried in the area.

In 1972, Hartley and Hartley sold out to SCA Services, Inc. in Somerville, MA. Hartley and Hartley continued to operate the site for SCA Services, Inc. In 1978 the landfill was closed due to an on-site industrial waste incinerator being in noncompliance with State of Michigan incinerator effluent (non-radiologic) requirements.

In 1980 an aerial radiologic survey was conducted in the area because State of Michigan agencies were concerned that material formerly used at a St. Louis, MI facility may have been disposed in the area. This survey indicated an excess of Tl-208, a daughter of Th-232, over the Kawkawlin landfill.

In 1983 radiation surveys and soil sample analyses were conducted by the State of Michigan and EPA. Direct radiation measurements at some locations on the SCA Services, Inc. and MDNR properties showed up to 80

uR/hr at waist level, compared to background levels of 3-5 uR/hr. Soil samples showed 36 to 670 pCi/gm (dry) of Th-232 with its daughter products, and 6 to 20 percent magnesium. In physical appearance the material resembled the thorium-magnesium slag stored at the Dow storage areas in Midland and Bay City.

In May 1983 seven residential water supplies around the landfill area were analyzed for 40 different hazardous materials. No hazardous materials above background levels were found.

In August 1983 NRC/Region III performed independent sampling of soil, rock (or slag), and metal mesh collected at the site. Exposure rate measurements were also taken. The highest surface reading was 800 uR/hr with a background of 5-6 uR/hr. A grayish material usually covered the area where radiation levels ranged from 100 to about 600 uR/hr. It was in these areas where the soil, rock, and mesh samples were collected. Direct surveys of these samples in their containers showed radiation levels of background up to 2.5 times background. When surface material was removed the radiation levels did not change appreciably indicating that the contamination extended deeper into the soil. It was not known how deep the contamination extended. The soil samples were split with the State of Michigan. The NRC results showed Th-232 activity levels of 52-165 pCi/gm, Th-230 activity levels of 71-356 pCi/gm, and Th-228 activity levels of 39-120 pCi/gm. The presence of K-40, Cs-137, Tl-208, Pb-212, Pb-214, Bi-212, Bi-214, Ac-228, and Pa-234 was also noted by gamma spectroscopy.

In 1983 NRC/Region III staff interviewed several individuals who might be knowledgeable on the disposal of the contaminated material found in the Kawkawlin landfill. Both representatives of Dow Chemical Company and Wellman Dynamics Corporation were contacted. In these interviews it was learned that thorium-magnesium slag from Wellman was transferred to Dow until about 1970. However, when Dow stopped accepting this waste it apparently was disposed by Hartley and Hartley at the Kawkawlin landfill in violation of AEC requirements.

In 1984 NRC/Region III staff made several inspections to review the containment measures being taken at the Kawkawlin landfill and the adjacent MDNR property to isolate the migration of toxic chemical wastes. These toxic chemicals had been detected in surface waters at the site. Containment measures included the installation of bentonite slurry wall, clay capping, and monitoring wells. The State of Michigan requested input from the NRC on whether the containment measures being taken for the toxic chemicals would also provide protection for the radioactive hazard. The NRC staff agreed to have ORAU perform a survey that would be the basis for a hazard evaluation. The ORAU survey was undertaken in July 1984. Thoriated material was found in the Kawkawlin landfill and on the MDNR property in a layer about 10 cm thick lying about 25 to 25 cm below the surface. An additional contaminated area was located on adjacent property owned by Hartley. This contamination appeared to be confined to the

surface and significantly less extensive in area than the contamination in the Kawkawlin landfill and the MDNR property. About 150 cubic meters would require removal. This waste has remained in place since 1984.

Based on the ORAU survey it was concluded by NRC and State of Michigan staff that the contamination levels exceeded Option 4 in the 1981 Branch Technical Position of Uranium and Thorium Wastes. It was also concluded that the toxic chemical and radioactive waste mixture would make the wastes unacceptable at a chemical or radioactive waste disposal site. It was agreed that a monitoring program would be implemented and restriction placed on the deed to prohibit intrusion activities. With these measures in place the containment measures would likely be acceptable for the thorium-magnesium slag. It appeared to be a suitable solution considering the lack of permitted or licensed disposal sites that would accept the wastes.

Monitoring wells were installed and a program implemented to require semi-annual monitoring through 1990 and yearly thereafter through 2005. At that time the site owner may demonstrate that additional monitoring might be unnecessary. Samples would also be monitored for radioactivity as well as the toxic chemicals that were expected to migrate more readily than the radioactive species.

In an inspection in October 1984 a sample from a surface water source at the Kawkawlin landfill was taken and analyzed. The sample showed an activity level of 3 pCi/l compared with the 15 pCi/l EPA limit for drinking water. Groundwater samples taken in 1985 and 1986 also showed very low activity levels. Additional sampling of water and soil were performed in the fall of 1989. The results of these analyses, however, are unavailable at this time.

In a meeting on June 28, 1988 Dow appeared sympathetic to the idea of disposing of the contaminated material in the Kawkawlin landfill and the MDNR property at their Salzburg disposal facility. As consideration Dow asked that they not be named as a Potentially Responsible Party. This idea is still unofficial and has not been sanctioned by Dow management. At this time no official commitment from Dow has been made.

In July 1989 a Letter of Agreement was signed by the State of Michigan and the NRC to continue radiologic sampling for three more years. Three surface and four monitoring wells are to be sampled each year.

The Kawkawlin landfill is located in the Tobico Marsh Game Area. No detailed hydrology data is available in the licensing file. However, the area is marshy and groundwater sampling is required under the agreement between the current site owner, Waste Management, Inc., the State of Michigan, and the NRC. There are residential wells in the area, but over the last ten years fewer are in use as public drinking water systems

become available. Sampling data obtained to date thorium concentrations to be less than EPA drinking water limits.

3. Description of Wastes

The contaminated material in the Kawkawlin landfill and the adjacent MDNR property is an insoluble thorium-magnesium slag similar to that in storage at the Bay City and Midland storage areas. The total volume is uncertain. The radiologic characteristics are not well characterized, but surveys show the thorium-magnesium to be non-homogeneous. Direct radiation measurements ranged from background (about 7 uR/hr) to 110 uR/hr at waist level. Soil samples generally showed activities as high as 96 pCi/gm Th-232 and 64 pCi/gm Th-228. One small area on the MDNR property had an activity level of 561 pCi/gm Th-232 and 527 pCi/gm Th-228. Groundwater sampling data confirm that the material is insoluble.

4. Description of the Radiologic Hazard

The principal hazards associated with the contamination at the Kawkawlin landfill and the MDNR property involve direct exposure, inhalation, ingestion, intrusion, and groundwater. No immediate threat to public health and safety exists. The direct exposure, inhalation, and ingestion hazards are low because of the containment measures taken at both the Kawkawlin landfill and the MDNR property. Containment measures, however, have not been taken for the small contaminated area on the Hartley site. These containment measures included installing a clay cap over the areas. The Kawkawlin site is fenced and under the control of Waste Management, Inc. Deed restrictions have been added to the property.

The MDNR property is owned by the State of Michigan and is fenced. Therefore, intrusion hazards will be low. Because the contaminated thorium material is in an insoluble form, groundwater hazards will be low. This is confirmed by the groundwater and surface water monitoring program. Sampling data indicate thorium levels continue to be well less than EPA drinking water standards.

5. Financial Assurance Required and Responsible Organization

There is no license for possession of radioactive material at either the Kawkawlin landfill or the MDNR property. Therefore, the financial assurance requirements in the 1988 decommissioning rule do not apply.

The Kawkawlin landfill is currently owned by Waste Management, Inc., a very large corporation in the waste management remediation business. The MDNR property is owned by the State of Michigan.

At this time it is expected that Dow will fund the cleanup effort, if it is decided to dispose of the contaminated material at the Salzburg

facility. However, no specific funding arrangements have been agreed to by all the affected parties including Waste Management, Inc. and Wellman.

6. Status of the Decontamination Activities

On June 25, 1985 NRC Region III staff met with Michigan Department of Public Health staff and reached an understanding to undertake an independent water monitoring program at the MDNR and Kawkawlin sites. After this three year program a decision on future independent sampling would be made.

A resolution between the State of Michigan, NRC, and Dow will be needed to implement the disposal of the contaminated material in the Salzburg landfill. This issue will involve agreeing to the Dow request to remove them as a Potentially Responsible Party.

7. NRC Actions Needed and Timing

The NRC will schedule a meeting with the State of Michigan and Dow to discuss an agreement to remove the contaminated material at the Kawkawlin landfill and the MDNR property to the Salzburg landfill. The action to schedule a meeting will follow the NRC review of the Salzburg 10 CFR 20.302 disposal application for the Bay City and Midland thorium-magnesium wastes. The NRC review of the Salzburg application is scheduled to be completed by June 1990 pending the resolution of disposal issues of RCRA and radioactive wastes in the same area.

An agreement between the State of Michigan, Dow, and the NRC is scheduled to be completed by July 1990. This agreement will also cover the funding responsibilities for the cleanup activities. If Dow does not fund the entire cleanup activity, discussions with Waste Management, Inc. and Wellman will need to be scheduled. If an agreement is reached, an implementation plan will be prepared by whoever is identified as the designated party. NRC staff understands that Dow is not "in the loop" to consider the pickup of material for disposal in the Salzburg landfill other than the material located at the Bay City and Midland sites.

## Kerr-McGee Cimarron

### 1. Site Identification

Kerr-McGee Cimarron Plants

Crescent, Oklahoma

Docket No.'s 070-00925 (Uranium Plant) and 070-01193 (Plutonium Plant)

NRC Project Manager: J. Swift

### 2. Site Description

The site is located in a rural part of central Oklahoma. The site occupies 1,100 acres. There were two fuel fabrication plants on the site, one for plutonium fuels and one for low-enriched uranium fuels, plus several settling ponds and a burial ground, which were licensed as part of the Uranium Plant. Both plants were closed in 1975.

### 3. Description of Wastes

- a. **Uranium:** There is uranium contamination in the soil around the Uranium Plant and in the building itself. There is further uranium contamination in soil around the settling ponds and the burial ground. The extent of soil contamination, especially the depth, has not been adequately determined by Kerr-McGee. Preliminary evidence indicates that a few hundred thousand cubic feet of soil may contain uranium in concentrations between 30 pCi/g and 100 pCi/g.
- b. **Plutonium:** According to Kerr-McGee, the Plutonium Plant has been decontaminated to below current standards. There is apparently no plutonium contamination outside the building.
- c. **Thorium:** There is a small amount of thorium contamination in the soil around the old burial ground.

### 4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The only substantial contamination at present is low-solubility uranium in fairly low concentrations in the soil.

### 5. Financial Assurance/Viable Responsible Organization

The site is owned by Kerr-McGee Corporation and all licensed activities were conducted by Kerr-McGee. Kerr-McGee is able and willing to undertake necessary clean-up activities.

6. Status of the Decommissioning Activities

Kerr-McGee has submitted plans for the Plutonium Plant, and they have been approved. Kerr-McGee has submitted plans for the Uranium Plant, and they have been partly approved. The NRC staff has asked for better information on the extent of uranium contamination in the soil around the Plant.

Kerr-McGee has finished decontaminating the Plutonium Plant. At the Uranium Plant, Kerr-McGee has dug up and shipped away the contents of the burial ground and has started decontaminating the building. They have started surveying for uranium contamination in the soil around the building.

7. NRC Actions Needed and Timing

NRC contractors have recently completed a confirmatory survey for the Plutonium Plant. When the final survey results are available, the NRC staff will decide on Kerr-McGee's request for termination of the Plutonium Plant license. The NRC staff met with Kerr-McGee in December 1989 and in February 1990 to discuss additional information needed on uranium contamination in soil. Kerr-McGee has undertaken to obtain this information. A meeting on the site hydrology is scheduled for early March.



## Kerr-McGee Cushing

### 1. Site Identification

Kerr-McGee Cushing Plant  
Cushing, Oklahoma  
Docket No. 040-01478 (terminated)  
070-00712 (terminated)  
NRC Project Manager: J. Swift

### 2. Site Description

The site is located halfway between Oklahoma City and Tulsa. Uranium and thorium were chemically processed at the site between 1962 and 1966. In 1966, the site was decommissioned in accordance with practices at the time and the license terminated. Between 1972 and 1982, Kerr-McGee further decontaminated the site by burying some of the mildly contaminated soil in a sludge pit containing hazardous waste and shipping the more highly radioactive materials offsite. Some soil contamination has also been detected at levels higher than the Branch Technical Position Option 1 Criteria around and in process buildings which are no longer owned by Kerr-McGee.

### 3. Description of Wastes

- a. Sludge Pit No. 4: This pit contains hazardous waste and radioactive isotopes with concentrations as high as 90 pCi/g of Th-232, 80 pCi/g of Ra-226, and 18 pCi/g of U-238.
- b. Around buildings: There are some patches of contamination in and around the process buildings and in soil of Th-232, Ra-226, and U-238 which exceed 10 pCi/g.

### 4. Description of Radiologic Hazard

This site poses no immediate threat to the public from radioactivity.

### 5. Financial Assurance/Viable Responsible Organization

Kerr-McGee owns the land with the contaminated sludge pit but no longer owns the land containing the process buildings. Kerr-McGee is able and willing to clean up both areas. The site has been proposed for the Environmental Protection Agency's National Priorities List for Uncontrolled Hazardous Waste sites.

6. Status of the Decommissioning Activities

Kerr-McGee has met with the NRC on December 1, 1989, and on February 7, 1990, to discuss the site and proposes to decontaminate the areas around the buildings within a few months. They will then submit a decommissioning plan for the decontamination of sludge pit 4.

Kerr-McGee expects to complete a radiological survey of the northern part of the site, which contains Sludge Pit No. 4, within about a year and to complete a feasibility study within about 2 years.

7. NRC Actions Needed and Timing

NRC will have a confirmatory survey performed when Kerr-McGee finishes decontaminating the process areas around the buildings. The NRC will review the characterization data of the northern portion of the site and the following feasibility study as the information is received.

## Kerr-McGee West Chicago

### 1. Site Identification

Kerr-McGee Chemical Corporation, Rare Earths Facility  
West Chicago, Illinois  
Docket No. 40-2061  
NRC Project Manager: J. Swift

### 2. Site Description

The Kerr-McGee site is located in the town of West Chicago, Illinois. The site covers 43 acres divided in 3 sections; the 8 acre factory site which contained processing and other buildings; the 27 acre disposal site contains thorium ore residues and other processing wastes; and the 8 acre intermediate site connects the other two sites. The facility was closed in 1973. The facility processed ores for the thorium and rare earth content.

### 3. Description of Wastes

The onsite waste has been classified as §11(e)(2) byproduct material. The waste consists of ~14,100 m<sup>3</sup> of building and equipment rubble, ~172,300 m<sup>3</sup> of contaminated soil, ~300 m<sup>3</sup> of incinerator ash, ~54,900 m<sup>3</sup> of tailings, sludge, and pond sediments, and 300 m<sup>3</sup> of rare earth chemicals. Additionally, 3,800 m<sup>3</sup> of neutralization and stabilization agents will be added to the cell.

Also, located on the site is approximately 70,400 m<sup>3</sup> of contaminated soil from the residential areas and the Sanitary Treatment Plant. This material is classified as source material and is under the jurisdiction of Illinois. An additional 11,500 m<sup>3</sup> of contaminated soil is located at Reed-Keppler Park and there are some additional residential areas that contain contaminated soil.

### 4. Description of Radiologic Hazard

The site poses no immediate threat to the public. The site access is controlled. The tailing pile is covered with dirt to keep radiation levels down. Air monitors exist around the perimeter of the disposal site.

### 5. Financial Assurance/Viable Responsible Organization

Kerr-McGee is willing and able to decommission the site.

6. Status of the Decommissioning Activities

Kerr-McGee has submitted a plan for onsite encapsulation of the waste in an engineered disposal cell. The NRC staff issued in April 1989, the Supplement to the Final Environmental Statement. An Atomic Safety and Licensing Board (ASLB) held a hearing in December 1989, on groundwater issues. On February 13, 1990, the ASLB issued a decision in Kerr-McGee's favor.

Kerr-McGee has demolished most of the buildings on the site and is working on the two remaining buildings. Contaminated soil from residential areas is being stored on the site. Kerr-McGee plans to remove soil from additional residential areas this spring.

7. NRC Actions Needed and Timing

Pursuant to the Initial Decision of the ASLB, the NRC will issue a license amendment by February 23, 1990, authorizing Kerr-McGee to proceed with the proposed onsite disposal.

## Magnesium Elektron

### 1. Site Identification

Magnesium Elektron, Inc  
Flemington, NJ

License No. (NEW APPLICATION)  
Docket No. 040-08984

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

Processing of purchased zircon flour to produce zirconium chemicals began at the site in 1952. Magnesium Elektron purchased the site in 1973. The site consists of 113 acres in a rural area, of which about 30 are used in the operation. The site contains various buildings and effluent/sludge control lagoons. The site rests on two different types of shale which had folded and fractured, allowing for penetration by water. There is little information available concerning the groundwater.

Magnesium Elektron, Inc. (MEI) separates the byproducts and impurities from the ore of zirconium and manufactures zirconium chemicals for other industries which further process into finished products. The feed ore contains trace impurities of uranium and thorium and the waste sludge generated becomes source material because of the concentration effect of precipitating and separating the impurities (see attached diagram). The sludge is generated from this process and is stored in an onsite containment lagoon. The sludge contains the precipitated hydrates of uranium and thorium. There is no intended use from this sludge.

In 1989, NRC informed MEI that they were in possession of source materials in excess of quantities required to be licensed under 10 CFR 40 and directed MEI to apply for an NRC license. Subsequently, MEI submitted a license application to NRC (see below).

### 3. Description of Wastes

The sludge is deposited in two cement settling basins, and is periodically pumped to a containment lagoon for onsite storage.

The sludge is a wet solid which contains, among other constituents, low concentrations of uranium and thorium. Approximately 2700 tons of wet sludge are generated annually.

At the NRC inspection in January 1989, samples taken from the sludge bed indicated that the sludge had a source material concentration of 0.37%. In addition to the sludge, samples taken from the incoming zircon flour indicate that the flour had a source material concentration of 0.05%. This would result in an estimated source material inventory of 70 tons.

Based on the analysis, NRC informed MEI that it was in apparent violation of 10 CFR 40.3 (which has source material licensing levels of 0.05%) and directed it to submit an application for a license.

Radiation readings were taken at the NRC inspection. Background levels were observed to be 15 uR/hr. Radiation levels where the feed stocks are located were about 30 uR/hr. Radiation levels over the dry sludge beds ranged up to 350 uR/hr. A radiation level of 700 uR/hr was measured in a narrow band at the wooden tanks where precipitation of heavy metal occurs. Radiation levels in most other areas of the facility were on the order of 15-25 uR/hr.

The licensee plans to add sand and fly ash to the sludge in order to produce a daily cover soil for use by landfills. This soil would have a composition of less than 500 ppm source material. MEI indicates that this would put it outside the requirement for special consideration as a source material. This proposal will be reviewed during the processing of their application for a license.

4. Description of Radiologic Hazard

There is no immediate threat. The concentration of uranium and thorium in the material is low and the material does not appear to become airborne; hence exposures are low.

The NRC inspection indicated that an option for correcting the problem discovered at MEI was for MEI to submit an application for an NRC license; MEI has done this and the application is in NRC review.

The material that MEI states will be ultimately left onsite is indicated by MEI as potentially falling outside the requirement for special consideration as a source material.

5. Financial Assurance/Viable Responsible Organization

Decommissioning funding information is required as part of the license application. Funding information will be required of MEI.

With regard to a responsible organization, MEI has submitted a license application in response to the NRC directive. MEI is a wholly owned subsidiary of Magnesium Elektron, Ltd in England. MELtd is a wholly owned subsidiary of British Alcan Aluminum which is, in turn, a wholly owned subsidiary of Alcan Aluminum Ltd. of Canada.

6. Status of the Decommissioning Activities

As noted above, on August 7, 1989, MEI has submitted a license application for source material that was previously unlicensed. This was done in

response to an NRC directive that this would be an option for correcting this violation. This application is under review by the NRC.

The facility is in operation and there are no plans to decontaminate it at this time.

MEI has stated that it will remove all sludges in accordance with New Jersey ECRA regulations should it leave the site. MEI has stated that due to addition of sand and fly ash to the sludge, the ending composition of the sludge material would be less than 500 ppm of uranium and thorium.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

	<u>Date</u>
1. Review the license application submitted by the applicant including the decommissioning funding plan	<u>June 1991</u>
2. Determine if additional cleanup of the site or license condition is needed at this time	<u>June 1991</u>
3. If added cleanup is not need, remove site from list of sites	<u>December 1991</u>
4. If added cleanup is needed, review and approve decontamination	<u>June 1992</u>
5. Inspect implementation of decontamination plan	<u>December 1992</u>
6. Perform NRC survey of area being decontaminated and remove site from list	<u>March 1993</u>

B. Potential problems inhibiting site cleanup

None at this time

Mallinckrodt, Inc.

1. Site Identification

Mallinckrodt, Inc.  
St. Louis, Missouri  
Docket No. 040-06563  
NRC Project Manager: J. Swift

2. Site Description

The site is located between Interstate 70 and the Missouri River, in an industrial section of St. Louis. Radioactive material has been handled in three separate buildings onsite. Its Columbium/Tantalum processing operation is currently on standby. The site is within Mallinckrodt's large chemical processing complex.

3. Description of Wastes

The three buildings are undoubtedly contaminated with small quantities of natural uranium and thorium. All radioactive waste residues resulting from operations are shipped to a licensed low-level radioactive waste disposal facility or to a licensed uranium mill.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public, as it is a controlled Mallinckrodt property and the contamination is inside buildings.

5. Financial Assurance/Viable Responsible Organization

Mallinckrodt owns the site. Mallinckrodt is a large corporation which should be financially able to pay for decontamination.

6. Status of the Decommissioning Activities

This license was renewed December 9, 1989, for five years and stipulated that Section 40.36 of 10 CFR Part 40 be complied with by July 27, 1990.

None, as plant has a license to operate even though it is presently on standby status.

7. NRC Actions Needed and Timing

Staff will review the licensee's decommissioning financial assurance submittal due July 27, 1990. If processing is not resumed within the present license period, staff will seek decommissioning instead of further license renewal.



Molycorp, Inc. Washington, Pa

1. Site Identification

Molycorp, Inc.  
Washington, Pennsylvania  
Docket No. 40-8778  
NRC Project Manager: J. Swift

2. Site Description

The site consists of approximately 17 acres in Washington, Pennsylvania. Although the site is active, Molycorp no longer processes materials containing radioisotopes and possesses a storage only license. Material is spread throughout the site including holding ponds and a large slag pile, located in the southern part of the property.

3. Description of Wastes

There is thorium spread in low concentrations in the soil throughout most of the site, often exceeding 10 pCi/g and in some locations as high as 1000 pCi/g.

4. Description of Radiologic Hazard

There is no immediate threat to the public. The only substantial contamination at present is fairly low concentrations of thorium.

5. Financial Assurance/Viable Responsible Organization

The site is owned by Molycorp, and all licensed activities were conducted by Molycorp. Molycorp is probably able but not inclined to undertake the necessary clean-up activities to NRC specifications. Molycorp is a subsidiary of Unocal, an oil company.

6. Status of the Decommissioning Activities

Molycorp has proposed some decontamination criteria. The NRC has rejected these and requested Molycorp to create a better decontamination plan for the site.

Molycorp is attempting to create a plan for the decontamination of the site. A radiological survey of the site was done by an NRC contractor in 1985.

7. NRC Actions Needed and Timing

The NRC is in the process of examining Molycorp's request for renewal of their license, but no direct actions on decommissioning are being undertaken. Molycorp is still developing a decontamination plan which will be satisfactory to all participating parties but no submittal date for that plan has been established. When the plan is submitted, it will be reviewed by the NRC before any decommissioning activities are undertaken by the licensee.

Molycorp, Inc York, Pa

1. Site Identification

Molycorp, Inc.  
York, Pennsylvania  
Docket No. 40-8794  
NRC Project Manager: J. Swift

2. Site Description

The site is six acres in York, Pennsylvania. It was used to process lanthanide ores and concentrates containing low concentrations of thorium and uranium. The residue, which includes the uranium and thorium, was packaged into 55-gallon drums and stored on site. Most of this material has now been sent offsite to Mountain Pass, California, for further processing.

3. Description of Wastes

There is thorium in the soil throughout the site at concentrations exceeding 250 pCi/g.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The only substantial contamination is from thorium in the soil and buildings, and a limited number of 55-gallon drums of residue material.

5. Financial Assurance/Viable Responsible Organization

The site is owned by Molycorp, and all licensed activities were conducted by Molycorp. Molycorp is able and generally willing to undertake necessary clean-up operations. Molycorp is a subsidiary of Unocal, an oil company.

6. Status of the Decommissioning Activities

Molycorp has submitted a decontamination plan. The NRC has discussed the plan with Molycorp and asked that it be modified and resubmitted.

Molycorp has shipped much of the material stored on site to California. They are currently trying to devise a plan which the NRC will agree with to finish decontaminating the site.

7. NRC Actions Needed and Timing

The NRC is in the process of examining Molycorp's request for renewal of their license. Other than general discussions on decontamination requirements, little action on the NRC's part is expected until Molycorp submits a modified decontamination plan. Staff expects to review the plan in 1991.

## Nuclear Metals

### 1. Site Identification

Nuclear Metals, Inc.  
Concord, Mass

License No. SMB-179  
Docket No. 040-00672

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

Nuclear Metals Inc. (NMI) has manufactured products from depleted uranium for a variety of purposes since 1958. the facility consists of five major buildings on a 29.5 acre site in the town of Concord, Mass. The adjacent lands to the east and south of the site are residential. The buildings are still actively used in the manufacturing operations.

The major source of uranium at the NMI site was the discharge of neutralized pickling liquor containing copper and depleted uranium to an unlined holding basin between 1958 and 1985. In 1985, discharge to the holding basin ceased and the basin was covered with a synthetic cover in 1986.

The licensee has provided some information concerning local groundwater. This includes the long-term groundwater monitoring and also includes the results of the sampling (see below).

### 3. Description of Wastes

The holding basin contains approximately 250,000 pounds of depleted uranium and an unknown amount of nonradioactive copper.

### 4. Description of Radiologic Hazard

There is no immediate threat. The holding basin currently is completely fenced in and access is controlled through gates.

In addition, the licensee has had a contractor perform groundwater monitoring. Results of this monitoring has given no evidence of the migration of radioactive material to the groundwater.

Based on previously identified groundwater contamination with volatile organic compounds, the Commonwealth of Massachusetts, Department of Environmental Quality Engineering (DEQE) has classified Nuclear Metals as a "priority disposal site" and DEQE approval of all remedial actions at the site is thereby required. The licensee believes that volatile organic compounds are no longer a problem.

5. Financial Assurance/Viable Responsible Organization

With regard to responsible organization viability, Nuclear Metals has indicated that they are totally committed to completing decontamination and decommissioning of the holding basin and its contents. Nuclear Metals appears to have the financial ability to perform this activity; NMI indicates that they are the nation's largest commercial producer of depleted uranium products.

In addition, as noted above Massachusetts has classified Nuclear Metals as a "priority disposal site".

6. Status of Decontamination Activities

The licensee has indicated that it is committed to completing decontamination and decommissioning of the holding basin and its contents. To date, a formal decommissioning plan has not been submitted.

Nuclear Metals is currently exploring two options for treatment of the holding basin: 1) recycling the material in the basin for resource recovery (a pilot project to determine economic feasibility of recycling is in progress; this includes sampling of the contents of the basin); or 2) sending the basin contents to a burial site for disposal.

The licensee is expected to provide a decontamination plan during renewal of the license in 1990.

A factor in the process is that the Massachusetts DEQE has classified Nuclear Metals as a "priority disposal site". This means DEQE must approve all remedial actions at the site.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

- |   |                      |
|---|----------------------|
| 1. Review and approve plan for the decontamination of the holding basin at next license renewal | <u>June 1991</u>     |
| 2. Inspect implementation of decontamination plan (Ongoing)                                     | <u>June 1996</u>     |
| 3. Perform NRC survey of the area being decontaminated  | <u>December 1996</u> |
| 4. Amend license and remove site from list  | <u>June 1997</u>     |

**B. Potential problems inhibiting site cleanup**

**Licensee is still exploring options for treatment of contents of holding basin.**

**Massachusetts DEQE has classified Nuclear Metals as a "priority disposal site" and DEQE must approve all remedial actions at the site.**

## Permagrain Products

### 1. Site Identification

Permagrain Products  
Media, Pa

License No. 37-17860-02  
Docket No. 030-29288

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

This facility includes a large pool irradiator and six hot cells. The building was built in 1957 to house a research reactor and the hot cells. Various companies have owned and operated the facility since then, including Curtiss-Wright, Martin Marietta Arco, and NUMEC.

In 1960, Curtiss-Wright donated the site to Penn State University. The site is now owned by the Pennsylvania Forest Service. The site is located in the Quehanna Wild Area, a Pennsylvania state game preserve.

The facility is located in north central Pennsylvania, about 50 miles northwest of State College. It is removed from populated areas. The nearest population centers are 10 miles away and are very small towns.

Permagrain purchased the operation from Arco in 1978. NRC issued a byproduct materials license in December 1977 which authorized the use of the former reactor pool for underwater irradiation to produce plastic impregnated wood products for commercial sale. Cobalt-60 contained within sealed sources is the material used for irradiation. The pool now houses the irradiator.

### 3. Description of Waste

The contamination is in the form of contaminated inactive facilities including ventilation systems, storage tanks, hot cells, and drainage tanks. The principal contaminant isotope is strontium-90 which was used by Martin-Marietta during the time period (1962-1967) in which they leased the hot cells for production of Sr-90 heat sources. The volume of waste is unknown, but is estimated to be less than 15 millicuries of Sr-90.

A site characterization plan is being prepared by the licensee to better define the radioactive contamination.

### 4. Description of Radiologic Hazard

There is no immediate threat. The contamination is confined to facilities onsite and there is no public access to these facilities.



Measurements made by the State of Pennsylvania and by EG&G and ORAU for the NRC indicate that no groundwater contamination is occurring as a result of past activities at the site, thus indicating no evidence of migration of radioactive materials from the facility.

5. Financial Assurance/Viable Responsible Organization

The licensee will be required to submit a decommissioning plan during the next license renewal. Decommissioning funding provisions will be addressed in that submittal.

With regard to the viable responsible organization, the licensee is probably not financially capable of decontaminating the site. However the Commonwealth of Pennsylvania, as owner of the property, has accepted responsibility for providing the financial resources required for decontamination. NRC is aware of a lease agreement between Permagrain and the Pennsylvania Dept of Environmental Resources (DER) in which DER acknowledges that Permagrain is not responsible for decontamination of the site.

NRC has reminded Permagrain that, notwithstanding the financial agreements with DER, the responsibility for compliance with NRC requirements of site characterization and decommissioning rests with the licensee, Perma-grain.

6. Status of Decommissioning Activities

The license for Permagrain contains conditions that Permagrain do the following: 1) submit to NRC a survey plan to characterize the extent of onsite radioactive contamination, and 2) submit to NRC a plan and schedule for the removal, packaging, remediation, and disposal of all radioactive materials authorized by the license.

Permagrain is preparing the site characterization plan that is expected to be submitted 1990. They have indicated some difficulties with DER in keeping this effort on schedule.

After the site characterization plan is approved and implemented, the decommissioning plan will be submitted it is expected that this will be submitted in 1991.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

1. Review and approve the site characterization plan

December 1990

2. Inspect implementation of the plan

June 1991

3. Review and approve decommissioning plan based on the results of site characterization of the decommissioning plan December 1991  
Inspect Implementation  
June 1992
5. Perform NRC closeout survey March 1993
6. Perform NRC closeout survey June 1993

**B. Potential problems inhibiting site cleanup**

Licensee is probably not financially capable of decontaminating site; funding for project by the state of Pennsylvania needs to be monitored to assure continued progress.

## Pesses (METCOA) Site

### 1. Site Identification

Pesses Company (METCOA)  
Route 551 and Metallurgical Way  
Pulaski, PA 16143

License No. STB-1254  
Docket No. 040-08406

NRC Project Manager: Tim Johnson, LLWM

### 2. Site Description

The Pesse Company (METCOA) site is a defunct metal reclaiming facility which was abandoned, without informing the NRC, after the company declared bankruptcy in 1983. The NRC became aware of the abandonment during a routine inspection in September 1984. Materials handled at the facility during operation from 1975 to 1983 included low-level radioactive compounds, such as ores containing uranium and thorium, thoriated magnesium and nickel, and nonradioactive heavy metals, such as chromium, cobalt, lead, cadmium, and copper. The site is located on 22 acres in a rural agricultural area. A 6 acre portion of the site, surrounded by a fence, contains four interconnected buildings that were used for scrap metal reprocessing and ferrocolumbium production.

Approximately 550 people live within one mile of the site. At least one home is within 1/4 mile, with 22 homes within 1/2 mile, and approximately 138 homes within 1 mile of the site. An open air farmers' market operates near the site during part of the year. The site is located in the Allegheny Plateau region, which is characterized by deep, narrow valleys and drains into the Delaware, Allegheny, and Monongahela River systems.

The NRC contracted with ORAU to perform a radiologic survey that was completed in November 1985 and revealed elevated levels of radiation from the waste generated by the metal processing operation. Soil samples collected also contained elevated levels of lead, chromium, and cadmium. The NRC brought the site to the attention of the Pennsylvania Department of Environmental Resources (PADER). PADER then conducted their own site assessment, including sampling, which confirmed the NRC findings. PADER requested that EPA perform a site assessment to investigate the potential threat to public health and the environment.

Between June and September 1986 Roy F. Weston, Inc., the EPA On-Scene Coordinator, performed a comprehensive site assessment which included soil, drum, surface water, and groundwater sampling. Geophysical surveys were also conducted including a magnetometer survey and ground penetrating radar. Roy F. Weston, Inc. requested CERCLA removal action to secure and stabilize the site to mitigate the potential threat presented at the site. Roy F. Weston, Inc. conducted the site stabilization phase of the cleanup.

OH Materials, Inc. of Findlay, OH was the prime contractor responsible for the staging and securing of waste materials. These activities consisted of creating bulk (slag waste) staging piles and covering the piles with a combination of visquene and geotextile fabrics. Included in the activities were the staging of approximately 1500 drums located on-site. Approximately 1300 cubic yards of hazardous waste were collected in four piles. Roy F. Weston issued a report documenting the site and the stabilization activities. The visquene and geotextile coverings subsequently deteriorated and are now ineffective in minimizing the infiltration of water and preventing transport of sediments due to wind and water. In November 1988 the EPA proposed to restabilize these waste piles. This restabilization took place in November 1989.

The original license authorized disposal of the slag waste products. It is uncertain whether on-site disposals took place. The licensee claims that no disposals took place and no specific burial sites were found during the site surveys. However, there is soil contamination at various locations on the site.

Specific hydrological data is unavailable. However, surface drainage patterns were studied in the stabilization program so the barriers to sediment transport could be installed. One well exists on-site. This well and surface water in streams, drainage ditches, and ponds was sampled in the ORAU site survey. No contamination in water or sediment samples was found. Current sampling data are unavailable. Buchanan Run is a small stream that flows adjacent to the site.

Security of the fenced in area containing the radioactive material is provided by the Pulaski Township Police.

On January 22, 1986 the NRC issued an Order requiring the licensee or its successor to submit a decontamination plan, complete the decontamination, submit a final survey report, and control entry to the site until the NRC could confirm that the decontamination had been properly performed. The licensee failed to comply with the order.

### 3. Description of Wastes

There are approximately 1500 drums, boxes, and overpacks of waste stored at the METCOA site. These wastes are considered to be mixed wastes. These wastes are magnesium-thorium turnings and other heavy metals which would have been reprocessed. The condition of some of the waste containers have deteriorated. There are also about 500 cubic yards in four piles of contaminated soil and a low solubility, siliceous slag material. These materials are contaminated with thorium. The surface soil is contaminated with Th-232 (up to 2410 pCi/gm) and Th-228 (up to 2040 pCi/gm). Exposure rates around the drums are about 30 - 50 uR/hr with some up to 1 mR/hr. There are 800 cubic yards of hazardous wastes containing chromium, lead, and cadmium.

Currently, some of the packaged waste is being stored in the buildings. Some remains outside. All deteriorated containers were overpacked in the first stabilization program.

4. Description of the Radiologic Hazard

The principal hazards associated with the contamination and wastes at the METCOA site involve inhalation, ingestion, intrusion, and groundwater. No immediate threats to public health and safety exist. Stabilization measures have been taken to minimize the transport of radioactive materials from the site. Although deterioration of visquene and geotextile barriers has occurred, restabilization efforts have taken place. The inhalation and ingestion hazards are considered to be minimal. The intrusion hazard is minimized by the fencing around the contaminated areas and local police security. The waste slag has a very low solubility which is not expected to result in contamination of groundwater supplies. Samples of surface waters and groundwater confirm that radioactive materials have not migrated.

5. Financial Assurance Required and Responsible Organization

The Pesses Company possession limit is 100,000 kg of source material containing 2,000 kg of thorium (440 mCi). Under this possession limit a decommissioning funding plan would be required. However, the licensee has gone bankrupt and its remaining assets are insufficient to fund the site cleanup. Stabilization efforts have been funded by the Superfund. The Principal Responsible Parties funded the restabilization efforts.

The NRC also became a party in the bankruptcy litigation. The bankruptcy court ruled that the NRC had the same claim to the licensee's assets as an unsecured creditor.

6. Status of the Decontamination Activities

In 1987 the site was stabilized under Superfund. Additional restabilization efforts to correct the deterioration of the visquene and geotextile barriers was performed in 1989. A final cleanup plan and schedule have not been developed. Because the relative hazard at the METCOA site is low, it is expected that EPA will not complete the cleanup in the near future due to the site's low Superfund priority.

Because the wastes are considered to be mixed wastes, these wastes will need to remain in storage until a mixed waste disposal facility is available. The Commonwealth of Pennsylvania is planning to provide mixed waste disposal capacity at its low-level waste disposal facility to be constructed in the early 1990's.

7. NRC Actions Needed and Timing

A final cleanup plan and schedule are needed. NRC needs to request resolution of final cleanup issues.

The NRC actions will be --

	<u>Date</u>
1. Request final cleanup plan and schedule from EPA	_____
2. Request from Commonwealth of Pennsylvania date mixed waste disposal facility will be available	_____
3. Review final cleanup plan	_____
4. Inspect implementation of cleanup	_____
5. Review EPA close-out survey data	_____
6. Perform NRC final survey	_____
7. Document cleanup and final survey	_____

## Process Technology

### 1. Site Identification

Process Technology of North Jersey, Inc  
(previously known as Radiation  
Technology, Inc, or RTI)  
Rockaway, NJ

License No. 29-13613-02

Docket No. 030-07022

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

Process Technology, Inc (PTI) is licensed by the NRC to perform service irradiations of a variety of items using a large, mega-curie cobalt-60 in-air irradiator.

Previous leakage from sources has resulted in low-level Co-60 contamination of the irradiator pool and other areas of the facility, including contamination of soil in unrestricted areas. In addition, radioactive waste was buried on the site in the past.

The site is located in a suburban location on approximately 100 acres. Facility buildings and work areas occupy 5 acres of a restricted access site on the north side of Lake Denmark Road. PTI also owns about 100 acres of unrestricted land on the south side of the road. The unrestricted area has been leased by several different organizations. (See attached figure).

Little groundwater information is available to the NRC.

### 3. Description of Wastes

Cobalt-60 contamination on the site resulted from the previous burials of waste materials and the residue from the effluent from the regeneration of the licensee's demineralizers.

In April 1987, at NRC's request, Oak Ridge Associated Universities conducted a radiological survey of the unrestricted areas of the RTI property. More recently, RTI has conducted and submitted a radiological survey of the site and transmitted the results to NRC.

There are two areas of soil contaminated with Co-60. The first is 10 feet by 20 feet, the second is 15 feet by 30 feet. The quantity of contaminated soil remaining onsite is not yet estimated. In addition, some contaminated debris remains buried.

### 4. Description of Radiologic Hazard

There is no immediate threat. Previously discovered buried drums of radioactive waste material have been removed, leaving only contaminated soil. External radiation exposure and airborne exposure is low.

In addition, damaged source pencils were placed in shipping casks in December 1989.

5. Financial Assurance/Viable Responsible Organization

Based on the possession limits in the license, the licensee will require \$750,000 for the cobalt-60 and tritium contamination onsite to satisfy the decommissioning rule requirements.

With regard to a viable responsible organization, PTI appears to have the capability to perform the necessary activities. PTI continues to maintain an NRC byproduct license for cobalt-60 irradiation. In addition, work by PTI is already in progress to decontaminate the site.

6. Status of the Decontamination Activities

The current byproduct license held by Process Technology of North Jersey contains the following conditions:

- 1) The licensee shall characterize and plan for the removal, packaging, and disposal of all licensed contamination, including on-site and off-site contaminated soil; this includes submittal of a survey report characterizing the extent of all on-site and off-site radioactive contamination associated with previous operations of the licensee and describing all radioactive licensed contaminated material, including buried wastes;
- 2) the licensee shall plan and complete the removal, packaging, and disposal of the licensed material which is stored in the R and D pool.

The current byproduct license expires March 31, 1990. A renewal application has been submitted and received by NRC. NRC is deliberating on the continued licensing of this facility.

Site characterization and remediation plans were submitted by Process Technology of North Jersey in letters dated May 12, 1987, March 20, 1989, March 31, 1989, May 1, 1989, and July 6, 1989, and were approved by the NRC. The licensee has completed radiological surveys of their facility and submitted the results in letters dated May 12, 1987, and December 14, 1988, to the NRC. A large portion of the licensee's waste has been consolidated and removed for disposal. The licensee is currently preparing for another shipment. The licensee has completed the removal, packaging and disposal of most of the licensed material stored in the R



and D pool. Usable sealed sources are expected to be retained for irradiation use.

NRC Region I is expecting additional information from the licensee regarding the following issues:

- ° Radiation survey results following contamination removal.
- ° Estimation of the potential for additional buried waste at the site.
- ° Confirmation from the licensee that in the event of a termination of licensed activity, immediate action will be taken to reduce surface soil contamination to less than eight picocuries per gram.

7. NRC Actions Needed and Timing

A. NRC actions consist of the following:

	<u>Date</u>
1. Evaluate the need for further cleanup based on the results of surveying for added contamination or buried wastes	<u>December 1990</u>
2. Review and approve decontamination plan	<u>Completed 1989</u>
3. Inspect implementation of plan	<u>September 1991</u>
4. Perform NRC survey of site	<u>August 1992</u>
5. Remove license condition regarding storage of contaminated materials	<u>December 1993</u>

B. Potential Problems inhibiting site cleanup

None at this time.

## Remington Arms Company's Lake City Ammunition Plant Site

### 1. Site Identification

Remington Arms Company, Inc.  
Lake City Army Ammunition  
Plant (LCAAP)  
Independence, MO

License No. SUB 1195  
Docket No. 040-8303  
(Issued to Dept. of Army)  
License No. SUB-1380  
Docket No. 40-8767

Site Location: Independence, MO

NRC Project Manager: Bruce Mallett, Region III

### 2. Site Description

Lake City Army Ammunition Plant (LCAAP) is Government-owned, but was once a contractor operated (GOCO) facility. Remington Arms Company, Incorporated, under contract to the U.S. Army, operated the facilities at LCAAP, Independence, Missouri, until November 1985. The operations at LCAAP included the assembly, machining testing, and demilitarization of ammunition rounds containing Depleted Uranium (DU). As the operating contractor, Remington was responsible for maintaining the Nuclear Regulatory Commission (NRC) licenses needed to perform operations at the plant. As such, Remington held and maintained NRC License SUB 1195.

The site is about seven miles north of Blue Springs, Missouri (population, 33,000), seven miles east of Independence, MO (population 110,000), and 20 miles east of Kansas City, MO (population 448,000). It is on a tract of approximately 3,909 acres. The nearest town, Buckner, Missouri, (population about 3,000) is located three miles east of the site. The site is in the middle of agricultural land which yields corn and soybeans as major crops and where considerable amount of cattle and pig farming is done.

The site is fenced off and provided with a 24 hour a day security. There are 30 major buildings on-site. The site has a groundwater or spring fed natural lake which is stocked with fish (bass). This lake is located at the northeast corner of the plant, directly beyond the end of the firing ranges. Site personnel is known to occasionally fish from this lake. Military personnel and their family (about 30 people) live in 11 houses located at the southwest corner of the site. About 1,800 to 1,900 workers are present on the site ten hours a day, during a four-day work week. Most of the workers live in Blue Springs, Kansas City, and Independence, MO.

Because of a requirement to use areas in Buildings 12A and 3A in Fiscal Year 1985, the Army began plans for cleanup. Funding for the cleanup of the buildings was programmed for Fiscal Year 1986. During the first quarter, Fiscal Year 1986, Remington Arms Company, Incorporated lost the bid as operating contractor and urgency developed to clean up areas covered by NRC License No. SUB-1195. The Army attempted to complete the project during Fiscal Year 1986, but due to funding constraints and the realization of additional hazards on the firing range, it was not accomplished.

The licensee has designated seven on-site locations where water samples are taken annually. Immediate action will be initiated if depleted uranium concentrations significantly above background levels are found. The licensee's contractor would respond by increasing the water sampling to three-month intervals. The NRC staff will require the licensee to address the issue of contingency plans to contain the spread of contamination (e.g., during or after an accident fire or explosion of the remaining ordinance on site) when the licensee submits its draft decontamination plan prior to 1993.

An initial water sampling program in August and October, 1988, did not reveal any significant depleted uranium in any of the areas sampled.

The U.S. Army Environmental Hygiene Agency found no contamination of groundwater as a result of the depleted uranium contamination of the soil on site. NRC Region III should receive the results of the latest (November 1989) water sampling and analysis for DU by the last week of February 1990.

Some detailed information needed to evaluate the radiological hazard potential due to the past and continued operation of the site are not found in the licensing files at Region III as of January 18, 1990. For example:

- How are the DU and its daughter products distributed in the various particle size fractions of the contaminated sands at the 1,750- and 2,188-yard ranges?
- What particle size fractions of the contaminated sand are the DU and its daughter products most associated with?
- Are some particle size fractions of the sand contaminated with the DU and its daughter products in the 1,750- and 2,188- yard ranges and the sand at the storage pile liable to get airborne?

- If so, would these fractions be respirable once they are airborne?
- What are the geochemical properties of the so called "sand" referred to in Region III's reports?
- Is this so called sand material pure silicon dioxide or does it contain some clay minerals or other minerals which have some sorptive or retardation properties for DU and its daughter product radionuclides?
- In the larger context, are there adequate information on the geology, hydrology, geochemistry, ecology, land use and demography of the site to enable the NRC staff to perform radiological and environmental impact assessments due to the past or continued operation of the site?

The NRC Region III staff informed the NRC Headquarters (LLWM) staff on February 15, 1990 that they will require the licensee to address the above concerns in their submittal of the draft decommissioning plan for NRC review prior to 1993.

Region III staff also responded to the Headquarters staff concerns on page 5 of Attachment 1 to the February 9, 1990 memorandum from C. E. Norelius to R. L. Bangart as follows:

"a representative of the DOA informed a Region III inspector on February 5, 1990 that the Army Toxic and Hazardous Material Group will be performing characterization procedures of the firing range using a specially built vehicle. The vehicle will be equipped to detect Du concentrations without injury to personnel. The procedure and plans for decommissioning will be formulated and forwarded to the Region III office, hopefully, in April 1990."

### 3. Description of Wastes

The LCAAP site is contaminated with fragmented depleted uranium penetrators, and as discussed earlier, contains approximately 7,655 pounds (1531 millicuries) of depleted uranium. These small, solid DU fragments are mostly located on the firing range sites. The total volume of contaminated soil at these firing ranges is about 400,000 cubic feet. Large fragments of the depleted uranium have been removed from the bullet-catchers, containerized, and buried in a licensed low-level waste disposal site.

The site is comprised of two production buildings (decontaminated April 1987) and three firing ranges that extend about 2,000 yards. The firing ranges are infiltrated with DU fragments, lead and unexploded ordnance. The firing ranges at LCAAP are completely enclosed (i.e., fenced in) and secured from unauthorized entry at all times. Access to the ranges is controlled due to explosive hazards involved, personnel are required to sign in and out of the area, and suspected radioactively contaminated areas are marked off. Health physics personnel are required to inspect the enclosure at least at annual intervals.

The facilities at LCAAP were contaminated under the following operations:

- Development of the 22 mm, M101 type cartridge utilizing DU was performed in the early 1980's. Production of the 20 mm, M101 cartridge was started at LCAAP in May 1961, and completed in September 1963. An estimated 75,000 rounds were manufactured with each round containing approximately 206 grams of DU. During the production, Buildings 12A and 3A became contaminated, and approximately 1,500 20 mm cartridges were fired single shot to ranges of 1,750 and 2,188 yards for determining projectile velocity, accuracy, and functioning characteristics. This firing contaminated areas at the 1,750- and 2,188-yard ranges.
- Sometime in 1986, the 20 mm M101 cartridge was declared to be obsolete. Approximately 44,000 20 mm cartridges required demilitarization. These were located at various Army depots in the continental U.S. Since the M101 cartridges contained a fuse designed to function on impact, it was decided that the best method for demilitarization was to fire them into a slug butt and confined sand area with the fuse to function on impact. The approximately 44,000 20 mm M101 cartridges were demilitarized by firing into the 600-yard bullet catcher demilitarization, the sand contained in the bullet catcher was sifted to remove the DU fragments. The DU fragments were then packaged in accordance with current regulations and shipped off to a radioactive waste disposal site. The sand was then moved to a sand storage pile. Recent radiation monitoring indicates the sand storage pile and the areas around the 600-yard ranges are contaminated and still contain DU.

The difficulty in retrieving the sand arises from the complications introduced by the procedure used over the years of combining the sand in other bullet catchers at LCAAP with the sand from the 600-yard range. Due to this procedure, the sand storage pile contains other hazardous material such as lead and unexploded ordnance in addition to DU.

The licensee submitted a draft proposal entitled, "Remedial Feasibility Study for Lake City Army Ammunition Plant" to Region III during the first week of February 1990. This proposal describes radiation monitoring procedures (which minimize explosive hazards to health physics personnel) for determining the extent of DU contamination in the sand (soil) at the site. The final radiation monitoring plan will be submitted to Region III by April 1990.

The radioactive waste at LCAAP consists primarily of sand contaminated with DU and is located at the sand storage pile. The volume of this DU contaminated sand is approximately 3,000,000 cubic feet. The sand storage pile contains other hazardous material such as lead and unexploded ordnance in addition to DU and may have to be treated as mixed waste. The Extraction Procedure (EP) Toxicity test may have to be performed on these LCAAP wastes at the sand storage pile and the sand at the firing range according to the Resource Conservation Recovery Act (RCRA) protocols for identification of mixed waste. The DU contaminated waste resulting from the decontamination of the two production buildings, 3A and 12A were supposedly containerized and shipped off to a licensed low-level waste disposal facility for burial by Chem-Nuclear, the contractor responsible for cleaning up these buildings.

4. Description of the Radiologic Hazard from Waste and On-Site Contamination

The principal hazards associated with the DU contamination at the LCAAP are direct radiation exposure, inhalation, ingestion, intrusion, and groundwater.

The range area was used during the firing of approximately 61,240 rounds of 25 millimeter XM101 (Davy Crockett) penetrators. Each depleted uranium penetrator millicuries). The licensee estimated that 75 percent of the depleted uranium was recovered. They estimate that a "worst case" of 7,655 pounds (1,531 millicuries) of depleted uranium in small solid fragments may still remain on the range sites.

NRC Region-III staff's assessment is that the depleted uranium contamination does not present an immediate hazard or threat to public health and safety. This assessment is based upon the conditions at the site. Any unauthorized intrusion is minimized because the site is fenced and protected by 24 hour security guards. Most of the depleted uranium is still in solid form of large enough sizes and in a very insoluble physico-chemical form that it should not readily migrate either through the atmospheric (airborne) pathway for inhalation or liquid (surface or groundwater) pathway for ingestion.

5. Financial Assurance Required and Responsible Organization

The possession limits for LCAAP is four Curie(s) or 12,000 kilograms of DU (U-238) in the form of the metal. The current license expires on October 31, 1993. The licensee, the Department of Army, (DOA) is in the process of formulating a decommissioning plan and will submit the whole plan before renewal of the license in 1993.

However, to comply with the new decommissioning rule referenced in Section 40.36 of 10 CFR Part 40, the DOA has to submit a decommissioning funding plan or certification of financial assurance for decommissioning in the amount of \$750,000 by July, 1990. If a financial certification is made a decommissioning funding plan will need to be submitted at the next renewal prior to October 31, 1993.

6. Status of the Decontamination Activities

Inactive until a decontamination plan is submitted and approved.

7. NRC Actions Needed and Timing

Perform EP Toxicity test per RCRA protocols to determine if the waste on the LCAAP site is mixed waste.

Review the licensee's draft proposal (dated February 1990) and entitled "Remedial Feasibility Study for Lake City Army Ammunition Plant."

Review the final radiation monitoring plan submitted by licensee in April 1990.

Review the DOA's decommissioning funding plan or certification of financial assurance for decommissioning submitted in July 1990.

Review the licensee's whole Decommissioning Plan which will be submitted prior to their license renewal in 1993.

## Safety Light Corporation

### 1. Site Identification

Safety Light Corporation  
4150-A Old Berwick Road  
Bloomsburg, PA 17815

License No. 37-00030-02  
Docket No. 030-05980

NRC Project Manager: Pat Vacca, IMNS

### 2. Site Description

The Safety Light Corporation site is located in central Pennsylvania approximately 0.6 miles east of Almedia, PA in South Centre Township along Old Berwick Road. Larger population centers nearby include Bloomsburg about 2.5 miles west and Berwick about 3 miles east of the site. At an elevation of 490 ft above mean sea level, the ten acre site is located on an old terrace and floodplain on the north bank of the Susquehanna River.

During World War II, the site was used to manufacture wooden toys. After the war, U.S. Radium Corporation purchased the site and began manufacturing self-illuminating watch and instrument dials and other articles containing radioactive materials. Most of these early activities involved the use of Ra-226. Except for radium operations, U.S. Radium Corporation was licensed by the AEC to use and distribute products containing a wide variety of radionuclides including C-14, Fe-55, Co-60, Ni-63, Zn-65, Sr-90, Cs-137, Po-210, Np-237, U-238, and Am-241. Since 1970 only tritium has been used at the site in the manufacture of self-illuminating exit signs and other light sources.

In 1980, U.S. Radium Corporation reorganized into a parent corporation (USR Industries, Inc.) with several subsidiaries. In 1982, USR Industries sold its subsidiary that conducted tritium light operations, called Safety Light Corporation, to Lime Ridge Industries, which was owned by three employees of Safety Light. These transfers are complex and are currently the subject of litigation before the NRC to determine if the NRC has jurisdiction over USR Industries and its subsidiaries. On January 29, 1990, the Atomic Safety and Licensing Board determined that the NRC has jurisdiction over USR Industries and its subsidiaries.

Contamination is found in and on buildings and in soils. Disposal of a variety of radioactive wastes took place on site in the 1950's. No records of the materials buried currently exist.

There are about ten buildings on-site in varying levels of disrepair. Current tritium light operations take place in a new building that is well maintained. Other contaminated buildings have had collapsed roofs and



floors and have had substantial water damage. These buildings not only represent radioactive hazards but also industrial hazards. Recently, Safety Light began the repair of some of these buildings.

Disposal of radioactive wastes and effluents generated on-site has been a licensing issue since operations began in the 1950's. Various approaches were used for waste disposal at the site, including injection into a dry well, open dumping, disposal in underground silos or pits, discharge to the sanitary sewer, dilution and discharge to the Susquehanna River, and disposal at licensed disposal facilities off site. The company made repeated changes in its waste disposal practices in response to directives from the AEC. U.S. Radium Corporation even proposed to dispose of its radioactive waste at abandoned mines, but was not granted appropriate authority by the AEC.

U.S. Radium Corporation terminated uses of radionuclides other than tritium in the late 1960's. At this time the AEC licensed it to decontaminate the site and prepare it for eventual release for unrestricted use. By the late 1970's little had been accomplished. In 1978 U.S. Radium Corporation identified more than 32 contaminated areas on the site and proposed a decontamination program to mitigate the contamination, beginning with those identified areas. This program, however, has not been fully implemented. A considerable portion of the site is still contaminated with varying levels of radium, tritium, Sr-90, and Cs-137. Some of these areas continue to release activity into the groundwater system and soils. In addition, only limited survey information is available to determine the extent of contamination. For example, a test pit excavated in 1979 by a U.S. Radium contractor in the old canal area between the manufacturing area and the river exposed radioactive materials, "oily" wastes, and wooden debris from 17 inches to 7 ft below the surface. More detailed surveys, if undertaken, may identify more extensive areas of radioactive and non-radioactive contamination.

In addition to sources of contamination on-site, there may also be contamination located off-site. Soil contaminated with Cs-137 was found on property immediately east of the Safety Light property. (Safety Light bought this property within the last year.) Much of this contamination was removed and relocated on Safety Light property. However, recent surveys still show some residual Cs-137 contamination in the soil.

Available monitoring data indicate that the soils beneath the site have been contaminated with Cs-137 and Ra-226. The data also indicate that shallow alluvial groundwater has been contaminated with Sr-90 and tritium. Substantial uncertainties exist about the extent of contamination and its rate of environmental transport because of the complexity of the site, inadequacies of sampling and analytical programs, and the lack of a detailed, comprehensive survey of the site. In addition, studies to date have not assessed the extent for non-radiological contamination that may

accompany the radiological contamination. Despite these limitations, available sampling data can be used to indicate the approximate location of contaminated areas and conduct preliminary assessments of the risks associated with the contamination. In a survey performed in 1982 by ORAU, sampling data from surface water and vegetation collected on and off the property do not contain elevated concentrations of radionuclides. Therefore, preliminary assessments indicate that disposal activities at the site have contaminated soil and shallow groundwater, but have not significantly contaminated surface water and vegetation off site.

Sampling data indicate that concentrations in surface soil are between 0.04 and 0.74 pCi/gm for Cs-137 and 0.44 and 0.74 pCi/gm for Ra-226. With the exception of an isolated area in the northwestern corner of the site, the contamination is limited to the area between the manufacturing buildings and the Susquehanna River. The highest concentrations are around (1) the liquid waste discharge canals, (2) the former plant dump sites, and (3) the abandoned canal that paralleled the river. The source of the elevated concentrations in the northwestern corner of the site has not been determined. In addition, the soil sampling data indicate elevated concentrations along the eastern property line. These elevated levels may be associated with the Cs-137 contamination that was excavated from the adjacent property and dumped on-site. Limited sampling at depth by ORAU has indicated deeper contamination of the soil in the same general locations as indicated by the surface samples. Sampling to date has been insufficient to determine the extent and distribution of Sr-90 contamination in soil. The concentrations of tritium and other radiological and non-radiological constituents have not yet been determined in surface and subsurface soils.

Groundwater sampling performed by the licensee and others, including the NRC, has indicated on-site and off-site contamination. In a study for the licensee performed in 1979 the presence of shallow, unconfined groundwater in a highly conductive, alluvial aquifer beneath the site was confirmed. The aquifer consists of gravels, sands, and silts deposited by glacial-fluvial and fluvial processes during the Quaternary Period. Water level measurements indicate a relatively flat hydraulic gradient from north to south beneath the site toward the river. However, the measurements also indicated river bank storage and groundwater mounding in the area immediately south of the disposal pits and lagoons. These transient variations in the water table elevation may divert groundwater flow beneath the site toward the east or west. In addition, the filled-in canal and other artificial modifications to the aquifer (e.g., the disposal pits) may affect the direction of groundwater flow and transport between the river and the manufacturing area. Further, on-site injection of effluents contaminated with Sr-90 and other radionuclides, as well as off-site pumping may have complicated the directions of groundwater flow and transport. Therefore, although the general hydraulic gradient in the alluvial aquifer is directed toward the river, off-site transport of contaminants to the east or west is reasonably likely.

Off-site transport of contamination is reflected in available groundwater monitoring data for tritium in a well on-site and in the private wells located off-site. Tritium concentrations vary significantly with time ranging from background to about 30,000 pCi/l in the Vance-Walton (off-site) well to 100,000 pCi/l in the on-site well. The EPA drinking water standard for tritium is 20,000 pCi/l.

Although there is considerable variation in the concentration data, the concentrations in these two wells appear to correlate after November 1985. The tritium concentrations in background groundwater samples range from below the detection limit to approximately 2,000 pCi/l. (The tritium concentrations in the off-site wells range up to about 30,000 pCi/l.) Thus, the elevated concentrations detected in the Vance-Walton well appear to be caused by transport of contaminated groundwater off-site. However, additional information would be needed to fully assess the extent and rate of the off-site transport.

In 1982 ORAU analyzed groundwater samples. Most of the elevated concentrations occur along the abandoned canal that runs along the back of the site just above the river. The highest concentration of tritium detected was 72,200 pCi/l. However, the contamination is spread over a larger area than was observed for the Cs-137 and Ra-226 in surface soils.

ORAU also made measurements of Sr-90 in groundwater. However, these measurements were insufficient to characterize the extent and rates of Sr-90 transport in the alluvial aquifer beneath the site. Available data indicate that shallow groundwater has been significantly contaminated with Sr-90. The data show widespread distribution of Sr-90 in the groundwater ranging from 3.4 to 62,100 pCi/l. The NRC limit for Sr-90 in water released to unrestricted areas is 300 pCi/l. The highest concentration was reported in a well located immediately adjacent to the disposal pits used during the 1950's. The bottom portion of the disposal pits is considered to extend below the water table.

In addition to the disposal pits, Sr-90 was discharged directly into the groundwater by injection into a dry well on-site. Although the location of this dry well is uncertain, the licensee reported that a well in the basement of the former personnel building was used for waste storage and disposal. Each month during the early 1950's, approximately 15 to 20 uCi of Sr-90 were disposed in the well at concentrations around 1 uCi/l. These injections may also have contributed to the contamination in the shallow aquifer and may account for the widespread distribution in the groundwater.

Available sampling data for Cs-137 and Ra-226 indicate that concentrations of these nuclides in the shallow groundwater are generally within the range of background. Some on-site wells, however, show elevated concentrations. Sampling and analysis has not been performed to determine the distribution of other nuclides and non-radiologic hazardous constituents in the shallow groundwater.

In the 1982 ORAU survey, direct gamma radiation measurements at 1 m above the surface in accessible areas at the property boundary range from 7 to 33 uR/hr. Background exposure rates in the Bloomsburg area are about 6 to 10 uR/hr. Higher readings were detected near the lagoons. The maximum reading was 133 uR/hr and was measured at 1 m above the surface south and southeast of the East Lagoon. The only elevated exposure rate off-site was detected in the area of the Cs-137 soil contamination, which has since been partially cleaned up. ORAU calculated doses and concluded that direct radiation exposure will only affect on-site residents.

ORAU estimated doses to workers from inhalation to be 0.02 mrem/yr. Doses from the consumption of food products grown on-site, assuming the site was released for unrestricted use, were computed to be 27.2 mrem/yr to the bone and 1.5 mrem/yr effective whole body equivalent. Groundwater concentrations of tritium, radium and strontium-90 exceed the EPA Maximum Contaminant Levels (MCL's). Doses from the consumption of groundwater were 5.4 rem/yr to the bone and 0.4 rem/yr effective whole body dose equivalent. Currently on-site groundwater is not used for human consumption. However, this could occur if the site is released for unrestricted use.

With the exception of tritium, radionuclides have not been detected off-site in groundwater. Monitoring data reported by the licensee indicated that the concentration of tritium in groundwater in the off-site wells has exceeded or come close to exceeding the EPA MCL for tritium (20,000 pCi/l) on occasion. Because of the limitations in the sampling programs and the direction of the groundwater flow, it is uncertain whether Sr-90 or other nuclides besides tritium have been transported off-site in groundwater.

The Susquehanna River is the only natural surface water body on or adjacent to the site. Because of the large average flow rate for the river at the site, discharge of contaminated groundwater would not be expected to cause significant increases above background levels of radionuclide concentrations in the river.

### 3. Description of Wastes

Contamination of the Safety Light property consists of buildings, soil, and groundwater. This contamination is principally tritium, Sr-90, Cs-137, and Ra-226. No estimate has been made of the total volume of contaminated material. However, the contamination throughout the site is extensive and mobile.

Measurements by ORAU indicate the following: the maximum soil concentration for Sr-90 is 15.4 pCi/gm, for Cs-137 is 631 pCi/gm, and for Ra-226 is 672 pCi/gm. The average soil concentration for Sr-90 is 3.5 pCi/gm, for Cs-137 is 20.1 pCi/gm, and for Ra-226 is 14.3 pCi/gm.

The maximum groundwater concentration identified for tritium is 72,200 pCi/l, for Sr-90 is 62,100 pCi/l, for Cs-137 is 57 pCi/l, and for Ra-226

is 9.1 pCi/l. The average groundwater concentration for tritium is 9,790 pCi/l, for Sr-90 is 10,800 pCi/l, for Cs-137 is 31.3 pCi/l, and for Ra-226 is 1.1 pCi/l.

There is also tritium waste (some in drums) on-site from current operations.

#### 4. Description of the Radiologic Hazard

The principal hazards associated with the contamination at the Safety Light site are direct exposure, inhalation, ingestion, intrusion, and groundwater. Areas are posted and fenced in compliance with 10 CFR Part 20 requirements. The contaminated areas were fenced in 1989, as a result of the NRC staff's March 1989 Order, thus, minimizing the effects of intrusion. Inhalation and ingestion pathway doses have been estimated to be 0.02 mrem/yr effective whole body equivalent for worker inhalation and 1.5 mrem/yr effective whole body equivalent for ingestion of food grown on-site. Groundwater sampling from an off-site well indicates that tritium levels have exceeded or approached the EPA MCL. The property on which this off-site well exists has been purchased by Safety Light. Groundwater doses from the use of on-site well water could result in a bone dose of 5.4 rem/yr and an effective whole body equivalent dose of 0.4 rem/yr. These doses would substantially exceed EPA drinking water standards. Currently, drinking water is not taken from on-site groundwater sources.

#### 5. Financial Assurance Required and Responsible Organization

The possession limit for Safety Light is 350,000 Ci of tritium. Because of these possession limits, Safety Light will be required under the 1988 Decommissioning Rule to either submit a decommissioning funding plan or a financial certification in the amount of \$750,000 by July 27, 1990. If a financial certification is submitted, a decommissioning funding plan would have to be submitted at the next renewal, which is currently under review.

A financial analysis of the Safety Light Corporation and other companies created from the reorganization of U.S. Radium was performed in June 1989. Safety Light had a net income in 1986 of \$101,541 and in 1987, \$197,798. Safety Light's total assets were \$1,449,902 in 1986 and \$1,814,653 in 1987. The other companies (including USR Industries and its subsidiaries) had net losses in 1986, 1987, and 1988 and had total assets of \$4,067,000 in 1986, \$5,834,000 in 1987, and \$4,967,000 in 1988. These total assets are subject to encumbrances and the net assets are expected to be insufficient to cover the costs of site cleanup. Because of the substantial liabilities associated with site cleanup, it is also unlikely that third-party financial instruments guaranteeing site decontamination and decommissioning could be obtained. Safety Light and the other corporations, however, do have insurance policies covering the site. It is unknown whether successful claims on these policies can

be made. Litigation concerning the coverage of these insurance policies is ongoing in New Jersey state court. Without insurance neither Safety Light nor the other companies are likely to be able to continue operations and fund a cleanup operation taking place in the next five to ten years.

By an NRC staff Order dated August 21, 1989, U.S. Radium, Safety Light, USR Industries, Inc., and their successors and subsidiaries were ordered to establish a trust fund for characterizing the contamination at the Safety Light site. Characterization was estimated by the NRC to cost about \$1,000,000.

On November 22, 1989, the Atomic Safety and Licensing Board issued a stay of the staff's August 21st Order. On December 1, 1989, the Licensing Board clarified the stay to include the staff's March 16th Order, with the exception that Safety Light was to maintain the fence required by that Order. On January 29, 1990, the Licensing Board determined that the NRC had jurisdiction over USR Industries and its subsidiaries. On February 8, 1990, the Licensing Board lifted the stay in part, requiring deposit into the trust fund required by the staff's August 1989 Order, but prohibiting disbursement of funds deposited into the trust.

Motions for directed certification of the Licensing Board's January and February Orders are now pending before the Atomic Safety and Licensing Appeal Board. On March 8, 1990, the Appeal Board further stayed the staff's August Order in that the deposit of cash into the trust is not required but USR Industries and the staff are required to negotiate as to what property of USR Industries, or security interests in that property, might be deposited into the trust to satisfy the intent of the staff's August Order. Those negotiations are ongoing. Litigation of all these issues continues.

#### 6. Status of the Decontamination Activities

On March 16, 1989 the NRC staff issued an Order to U.S. Radium, Safety Light, USR Industries and their successors and subsidiaries requiring them to prepare a plan for both site characterization and decontamination. The Order required (1) posting of the premises and control of access to all contaminated areas; (2) submission of a joint plan to characterize the radioactivity at the site; (3) following NRC staff approval of the plan, submission of a report that characterizes the site, and describes all sources of radiation and contamination; (4) submission of a decontamination plan with milestones for specific decontamination activities; and, (5) following NRC staff approval of the decontamination plan, implementation of that plan with status reports on the progress of the cleanup. The Order also prohibited abandonment or transfer of the facility without staff confirmation of decontamination. Although not completed by the deadline set by the staff, the site was posted and fenced as required under Item 1 above.

On June 2, 1989, after the staff extended the deadline, Safety Light, USR Industries, and the other respondents submitted a Joint Characterization Plan prepared by IT Corporation. The plan, however, did not satisfy the Order in several areas such as funding provisions and adequately detailed radiological and geohydrological survey of all facilities, surface and subsurface soil, and groundwater. On June 16, 1989 the staff advised Safety Light and USR Industries, in detail, why the characterization plan was unsatisfactory, that the companies were in apparent violation of the Order, and what actions might follow from this failure to comply.

On July 6, 1989 an Enforcement Conference was held. Safety Light and USR Industries explained that they considered that what they submitted addressed the immediate health threats and reflected their financial capability. They hoped to begin a dialogue (i.e., negotiate) the scope of the plan. They estimated that the full cost to characterize the site would be \$1,000,000. It was unclear how this plan would ultimately be funded. Counsel for USR Industries advised that USR Industries and its subsidiaries have had insurance coverage since 1964, and that they are seeking declaratory judgement as to coverage in an action involving 19 insurance companies. This action is pending in the Superior Court of New Jersey and is in an early discovery phase. Safety Light is also a party to this litigation. USR Industries is also subject to environmental cleanup litigation in Kentucky and New Jersey. The EPA, under Superfund, expects to spend \$53,000,000 to clean up three sites in New Jersey contaminated with radium. The source of the radium is presumed to be a former U.S. Radium facility one mile away.

On August 21, 1989 the NRC staff issued a second Order to establish a trust fund principally for site characterization. For more discussion of this Order, see item 5. above.

#### 7. NRC Actions and Timing

The establishment of the trust fund to characterize the site and determination of whether USR Industries and its subsidiaries are responsible for funding the cleanup must be resolved in the hearing process.

NRC actions will be dependent on the outcome of the hearing process and the ability of Safety Light, USR Industries, and their related companies to provide needed financial resources. NRC's actions are expected to include the following:

- |                                       | <u>Date</u> |
|---------------------------------------|-------------|
| 1. Review site characterization plan  | _____       |
| 2. Approve site characterization plan | _____       |

- |  | <u>Date</u> |
|--|-------------|
| 3. Inspect progress of site characterization                                 | _____       |
| 4. Review results of site characterization and proposed decontamination plan | _____       |
| 5. Approve decontamination plan  | _____       |
| 6. Inspect progress of decontamination                                       | _____       |
| 7. Review licensee closeout survey data                                      | _____       |
| 8. Perform final survey  | _____       |
| 9. Amend license to reflect cleanup  | _____       |





## Schott Glass Technologies

### 1. Site Identification

Schott Glass Technologies  
Duryea, Pennsylvania

License No. STB-988  
Docket No. 040-07924

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

Between 1969 and 1980, Schott Glass produced special optical glass containing up to 30% thorium by weight at their Duryea, Pennsylvania facility under NRC license STB-988. Production of this material ended in 1980. Subsequent radioactive surveys of the property indicated that some scrap material from this production was deposited in a landfill located on the Schott property, adjacent to buildings on the site.

The specified area of the landfill is located adjacent to the industrial structures of Schott Glass in an industrial park. The area is zoned industrial, in the Pocono Mountains with relatively low surrounding population density. Residential growth is considered unlikely.

The base of the landfill is undisturbed, relatively impervious clay soil indigenous to the area. The indigenous clay soil also provides a minimal covering of overburden for the landfill. The geology below the natural soil is sedimentary rock (principally shale). There are no surface waters in the immediate vicinity. The groundwater is of poor quality and is generally not used.

The radioactive material in the landfill consists primarily of licensed source material (thorium) and very small amounts of refractory tiles (uranium plus thorium). The licensed thorium is in the form of thoriated glass scrap. Naturally occurring radioactive material also exists in the soil. Quantities and hazards from these materials are discussed below.

### 3. Description of Wastes

The remaining material in the landfill consists of: (1) soil contaminated with scraps of thoriated glass from the manufacture of optical glass and (2) pieces of refractory tile that lined the ovens of the Schott plants containing trace amounts of thorium ( $\text{ThO}_2$ ) and uranium ( $\text{UO}_2$ ). The tiles contained less than 0.05% thorium plus uranium by weight and were thus not licensed as source material.

The landfill occupies an area approximately 250 feet wide and 250 feet long. Material is buried to a maximum depth of approximately 20 feet. The contaminated soil is contained in an area that would contain

an estimated 30,000 cu. yds. (834,000 cu. ft.) of material in the 20 foot depth. However, it is estimated that the volume is approximately 10,000 cu. yds. because it is not buried to a uniform 20 foot depth.

The Schott Glass decontamination plan includes results from a laboratory analysis of 5 soil samples from 4 locations on and around the landfill area on the contamination levels of Th-228 and Ra-226 in the soil. The information summarizing the lab analysis is included here as Table 1. The average concentration of Thorium in contaminated soil is approximately 2 pCi/gm. The concentration of Thorium in the glass scrap obtained from one of the soil samples is 4,710 pCi/gm.

A radiation survey of the landfill area yielded exposure rates ranging from 30 to 350 uR/hr. The average exposure in the landfill area is less than 200 uR/hr. Due to the presence of naturally occurring radionuclides in the area, the background exposure rates ranged from 30 to 50 uR/hr.

#### 4. Description of Radiologic Hazard

There is no immediate threat. The waste onsite is in the form of source material (thorium) in soil and in glass scraps.

The licensee has proposed that the waste in soil be disposed of under Option 1 in NRC's Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46 FR 52061). The average concentration of thorium in the contaminated soil is about 2 pCi/gm which is well below the 10 pCi/gm limit in Option 1.

The contamination in glass scrap is very unlikely to migrate offsite. The concentration of thorium in the glass scrap is above the amount allowed by the Technical Position

#### 5. Financial Assurance/Viable Responsible Organization

It is anticipated that the licensee will decommission the site before the funding requirements of the decommissioning plan will apply.

With regard to a responsible organization, the licensee has submitted a decommissioning plan for the purposes of terminating the license. The licensee appears capable of stabilizing the site in accordance with Option 1 of the Branch Technical Position.

#### 6. Status of the Decontamination Activities

Schott submitted a plan for the decontamination and disposal of the scrap material. The plan consisted of: 1) preliminary survey of the property; 2) collection and storage of immediately recoverable pieces of thoriated glass scrap from the landfill area, excavation of the entire landfill area to a depth of 4 feet below final grade, and collection and placement of

thoriated glass scraps at the excavated depths of greater than 4 feet below final grade; 3) placement of clean overburden to a depth of four feet; 4) final survey. Thus the thoriated glass scrap would be placed in the landfill at 4-foot burial depth.

The plan proposes that disposal of thorium contaminated soil be done under Option 1 of NRC's Technical position on disposal or onsite storage of thorium or uranium wastes from past operations. The concentration of the thorium in the soil is below the concentration limits in Option 1.

The Scott plan estimated the cost to transport and dispose of all of the contaminated material to licensed disposal facilities as being about \$18 million.

The plan also discussed the site characteristics favoring the planned disposal at the site. These include the fact that the landfill is in a remote area with only industrial activities, and no foreseeable reason for residential growth. The groundwater is of poor quality and not generally used.

NRC has reviewed the Schott plan and has sent the licensee a letter asking for additional information. In general, the NRC review found that the proposed disposal under Option 1 of the Technical Position may be authorized subject to certain conditions. In particular this included requiring the thoriated glass scrap which is collected to be disposed of in a licensed low-level waste disposal facility because it exceeds the levels in Option 1. Other information concerning land restrictions, costs, and notification of local governments was also requested.

The response from the license to the NRC request is pending. Communication with the licensee indicates that they will likely provide acceptable answers early in 1990.

## **7. NRC Actions Needed and Timing**

### **A. NRC actions consist of the following:**

	<u>Date</u>
1. Review and approve response to request for additional information using as a basis whether the response indicates that the requirements of the Branch Technical Position are met	<u>April 1990</u>
2. Inspect implementation of plan	<u>September 1990</u>
3. Perform NRC closeout survey	<u>December 1990</u>
4. Terminate license	<u>March 1991</u>

**8. Potential problems inhibiting site cleanup**

**None at this time.**

Shieldalloy Corp., Cambridge, Ohio

1. Site Identification

Shieldalloy Metallurgical Corporation  
Cambridge, Ohio  
Docket No. 40-8948  
NRC Project Manager: J. Swift

2. Site Description

The site is located south of Cambridge, Ohio, in open wetlands. The previous owners of the site had processed columbium ore, containing licensable quantities of thorium and uranium. The radionuclides from the ores became incorporated into waste slag and stored in two separate piles on site. Shieldalloy is in the process of decontaminating the site.

3. Description of Wastes

- a. West Pile: This pile consists of approximately 300,000 tons of slag over 8 acres with an average concentration of Th-232 of 2 pCi/g, U-238 of 3 pCi/g, and Ra-226 of 2.5 pCi/g.
- b. East Pile: This pile consists of approximately 90,000 tons of slag covering 2.6 acres with an average concentration of Th-232 of 4 pCi/g, U-238 of 21 pCi/g and Ra-226 of 66 pCi/g.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The only substantial contamination at present is insoluble uranium and thorium in slag material.

5. Financial Assurance/Viable Responsible Organization

The site is owned by Shieldalloy, although licensable activities were undertaken by previous owners. Shieldalloy is able and willing to undertake necessary clean-up activities.

6. Status of the Decommissioning Activities

Shieldalloy has submitted an approved Decommissioning Plan for the site, although a more detailed plan for dealing with the West pile is expected in Spring 1990. An outline plan for decommissioning the East pile is also expected in Spring 1990.

Shieldalloy has decontaminated all of the site except the slag piles and confirmatory surveys have been done on these decontaminated areas. Shieldalloy expects to submit a request for release of the West pile in early 1990. They hope to have the West pile released from their license by the end of 1990. They will then propose a plan for decommissioning the East pile.

7. NRC Actions Needed and Timing

NRC contractors have done confirmatory surveys of all land except the slag piles. The request for release of this land which was received in early February. The NRC will review this request as well as the expected Decommissioning Plan for the West pile. The NRC also plans to have active discussion with Shieldalloy about the final disposition of the East pile during Spring 1990. If Shieldalloy's proposal for the East pile is acceptable, this license might be terminated in 1992.

Shieldalloy Corp., Newfield, NJ

1. Site Identification

Shieldalloy Metallurgical Corporation  
Newfield, New Jersey  
Docket No. 40-7102  
NRC Project Manager: J. Swift

2. Site Description

This site covers 67.5 acres in south Newfield, New Jersey. There are multiple buildings on the property; however, all ferro-columbium smelting operations are conducted in a foundry, near the west central portion of the site. Ores are stored in a warehouse near the foundry. Slag, bag house dust, and miscellaneous scrap and waste from activities are stored in piles on the eastern portion of the site. The slag containing thorium and uranium is located in two piles.

3. Description of Wastes

- a. High Ratio Pile: This pile consists of slag with average concentrations of Th-232 of 366 pCi/g, Ra-226 of 69 pCi/g, and U-238 of 105 pCi/g.
- b. Standard Ratio Pile: This pile consists of slag with average concentrations of Th-232 of 516 pCi/g, Ra-226 of 123 pCi/g, and U-238 of 202 pCi/g.
- c. Soil Around Piles: Soil around the piles has average concentrations of Th-232 of 28.6 pCi/g, Ra-226 of 8.4 pCi/g, and U-238 of 10.5 pCi/g.
- d. Other: There are numerous locations of elevated soil contamination around the main yard of the site and in the foundry building.

4. Description of Radiologic Hazard

This site poses no immediate threat to the public. The only substantial contamination present is insoluble thorium and uranium in the slag pile and in low-levels in the soil.

5. Financial Assurance/Viable Responsible Organization

The site is owned by Shieldalloy and all licensed activities were conducted by Shieldalloy. Shieldalloy seems able and willing to undertake cleanup activities.



6. Status of the Decommissioning Activities

Shieldalloy has submitted a statement with their renewal application which states they are committed to the decommissioning of the facility at the cessation of operations and will submit a plan for approval prior to commencement of decommissioning operations.

Shieldalloy is currently developing a plan to consolidate all material extraneous to the piles onto the piles. They are also emphasizing new procedures and house cleaning techniques to keep any newly produced slag for the piles contained on the piles. There is no expectation for a detailed decontamination plan any time in the near future since the facility is still operating.

7. NRC Actions Needed and Timing

NRC is in the process of examining Shieldalloy's request for renewal of their operating license but no activities other than general discussions on decommissioning are planned until the licensee submits a decontamination plan under the Decommissioning Rule. NRC will follow Shieldalloy's consolidation effort as it occurs.

Texas Instruments, Inc.

1. Site Identification

Texas Instruments, Inc.  
Attleboro, MA

License No. SNM-23  
Docket No. 70-33

NRC Project Manager: J. Roth, Region I

2. Site Description

The Texas Instruments, Inc. facility is located in North Attleboro, MA south of Boston on Route 123. The site was owned by the General Plate Division of Metals and Controls, Inc. when it began to fabricate enriched uranium foils in 1952. The company later merged with Texas Instruments, Inc. Texas Instruments, Inc. fabricated fuel for the U.S. Navy and for commercial customers during the period from 1957 to 1983. No further licensed activities take place at this location.

In 1978 allegations were made by a member of the public that radioactive material may have been disposed at several places in the Attleboro, MA and Norton, MA areas. Upon investigation two areas containing radioactivity were confirmed. One containing uranium was at a private landfill on property owned by Mr. I. Shpack in Norton, MA and the other contained radium. The private landfill has subsequently been turned over to DOE for cleanup. The site containing radium is the responsibility of the Commonwealth of Massachusetts. It is believed that Texas Instruments, Inc. disposed of the uranium contaminated material now in the Shpack landfill.

The Texas Instruments, Inc. facility is approximately 100 acres in size. Fuel fabrication operations performed under contract to the Atomic Energy Commission took place in about six buildings. Operations performed under the NRC license took place in one part of one building having an area of about 10,000 ft<sup>2</sup>.

Some noncombustible uranium and thorium scrap metal and machinery were buried on-site in a disposal area between Buildings 11 and 12. The disposal area covered 1.1 hectares and is described as being at least 1.2 m deep and covered with a soil cap of unknown thickness. There is no indication that any liner material was used or that any natural liner exists. Information on the groundwater hydrology of this area is unavailable, however, six or seven groundwater monitoring wells were installed in 1980 - 1983 time frame. Sampling data obtained in 1983 indicated that concentrations of radioactive material in the groundwater was at background levels. More recent sampling data is unavailable.

The site was disturbed during construction of Building 12, and contaminated soil from the burial area may have been distributed over the construction site or moved off site. For these reasons the potentially contaminated area covers approximately 6.1 hectares. Based on a transit survey approximately 18 ft. of material may have been removed. It is believed that this material was disposed at the Shpack landfill.

Based on interviews with Texas Instruments, Inc. personnel and others it has been confirmed that industrial materials from the Texas Instruments, Inc. facility were disposed at the Shpack landfill. However, no confirmation has been provided that these industrial wastes included radioactive materials.

### 3. Description of Wastes

An unknown quantity of contaminated soil and metal scrap with at least 30 mCi of Uranium-235 and natural uranium in the oxide form were disposed at the Texas Instruments, Inc. North Attleboro site. Samples have been taken at the Shpack landfill site. These samples include a metal casting, soils, mud, and groundwater. The metal casting containing about 40 percent total uranium enriched to about 20 percent U-235 had a contact exposure of approximately 30 mR/hr. Depleted, natural, and enriched uranium was found in the soil samples at concentrations ranging from 1.35 pCi/gm to 0.225 uCi/gm. All the water samples were at background levels. Following a survey of other licensees in the area, Region I staff have concluded that some of these materials resulted from work performed by Metals and Controls (now Texas Instruments, Inc.) under contract to the Atomic Energy Commission. On this basis it was recommended that the responsibility for the cleanup of the Shpack landfill be turned over to DOE. The wastes are considered to be typical of what may have been disposed at the Texas Instruments, Inc. site in North Attleboro.

Material remaining at the North Attleboro site consists of contaminated soil. The buildings were decontaminated. Final survey data taken in January 1985 from the buildings indicate that no contaminated material at concentrations exceeding the Regulatory Guide 1.86 criteria remains.

Assuming that the radioactive materials in the Shpack landfill are similar to the contamination remaining at the Texas Instruments, Inc. site in North Attleboro, it appears there is little likelihood that the uranium contaminated soils present a migration or a dispersion hazard. There should be little migration hazard due to the low solubility of the uranium oxide materials and the contaminated area has been capped with a soil cover. Groundwater samples taken at the Shpack landfill indicate no groundwater migration from uranium contamination at that location.

4. Description of the Radiologic Hazard

The principal hazards associated with the contamination at the Texas Instruments, Inc. site in North Attleboro, MA involve inhalation, ingestion, intrusion, and groundwater. Because of the uranium oxide materials, the soil cap on the disposal area, small amounts of material remaining on-site, there is minimal hazard remaining at this facility.

5. Financial Assurance Required

The possession limit under this license is 700 grams of U-235 (approximately 45 mCi). Under the new decommissioning rule the license is required to have a financial certification in the amount of \$750,000 by July 27, 1990 and a decommissioning funding plan at their next renewal. However, the license expiration date was removed by license amendment on May 5, 1982 because the licensee was decommissioning the facility. Therefore, a license renewal will not be required.

Texas Instruments, Inc. is a very large company, is not in financial difficulty, and is considered to be capable of providing the required financial assurance.

6. Status of the Decontamination Activities

Texas Instruments, Inc. submitted a decommissioning plan on July 20, 1978. This plan was approved by the NRC on October 9, 1978. A detailed decontamination plan was submitted to the NRC in August 1981. In accordance to this detailed plan Texas Instruments, Inc. in 1983 cleaned up contamination at the North Attleboro site. ORAU performed the final NRC survey in January 1985. The final survey criteria used was the criteria in Regulatory Guide 1.86, which was incorporated into the license as a license condition.

7. NRC Actions Needed and Timing

NRC Region I staff verbally requested on numerous occasions from Texas Instruments, Inc. to provide documentation acknowledging that radioactive material from the North Attleboro site was transferred to the Shpack landfill. Texas Instruments, Inc., however, has not provided this information probably due to possible liability concerns with respect to the Shpack landfill cleanup.

To terminate the license either an acknowledgement of the disposition of the contaminated material is needed or the NRC staff needs to state that it considers the material in the Shpack landfill to be that removed from the North Attleboro site.

NRC actions will be:

- |  | <u>Date</u>          |
|--|----------------------|
| 1. Determine if acknowledgement of radioactive material disposition from Texas Instruments is needed | <u>August 1990</u>   |
| 2. Request from Texas Instruments acknowledgement of radioactive material disposition, if needed     | <u>November 1990</u> |
| 3. Terminate license   | <u>December 1991</u> |

## UNC Recovery Systems

### 1. Site Identification

UNC Recovery Systems  
Wood River Junction, Rhode Island  
Docket No. 70-820  
NRC Project Manager: J. Swift

### 2. Site Description

The site is located in Southwestern Rhode Island and occupies about 1,114 acres. UNC operated a scrap recovery facility from 1964 until 1980. The site contained buildings, lagoons, and an old burial ground.

### 3. Description of Wastes

The contamination consisted of enriched uranium and fission products on surfaces and in the soil, and some ground water contamination.

### 4. Description of Radiologic Hazard

The site poses no immediate threat to the public. The company has finished remediation activities.

### 5. Financial Assurance/Viable Responsible Organization

United Nuclear Corporation owns the site and has been willing and able to decontaminate the site to unrestricted release levels.

### 6. Status of the Decommissioning Activities

Decontamination is complete; no new plan is necessary.

ORAU has submitted the final confirmatory survey results. Ground water contamination is still present in a small area; one monitoring well near the river remains elevated. This well is below the 10 CFR Part 20 limits but above the drinking water standards for Sr-90 (12 pCi/l). Other wells on the site are at or near background levels. The system continues to flush into the river; no drinking water is affected. 6 men

### 7. NRC Actions Needed and Timing

The staff will offer to meet with the State of Rhode Island in the next few months, and plans to terminate the UNC license thereafter. The ground water issue is not expected to delay license termination.

## Westinghouse Electric Corporation Waltz Mill Site

### 1. Site Identification

Westinghouse Electric Corporation  
Advanced Power Systems Division  
P.O. Box 355  
Pittsburgh, PA 15235

License No. SNM-770  
Docket No. 070-00698

Site Location: Madison, PA (known as the Waltz Mill site)

NRC Project Manager: John Kinneman, Region I

### 2. Site Description

The Advanced Energy Systems Division (AESD) of the Westinghouse Electric Corporation (WEC) is the landlord division for the Waltz Mill site. WEC carries out a wide range of engineering design, research, development, and services at this site. Source, byproduct, and special nuclear material are used in a variety of chemical and physical forms in various laboratories and associated facilities. Decontamination of contaminated metal components from nuclear power plants is performed as a service basis. Laundry, liquid waste treatment, waste storage, and waste packaging facilities are also present. The Westinghouse Test Reactor (WTR), licensed under 10 CFR Part 50, is located at Waltz Mill. The WTR was shutdown on April 13, 1960. All fuel was removed from the site and the facility was partially dismantled.

The Waltz Mill site is near Waltz Mill, PA and Yukon, PA on a tract of approximately 850 acres in a sparsely settled area. The site is fenced and provided with a 24 hour a day security. There are 13 major buildings on-site. The WTR Liquid Waste Retention Basin, the evaporator plant, and certain tanks are not part of license SNM-770.

Strontium-90 groundwater contamination is present from a still unidentified source. In November 1982 the license was amended to require quarterly sampling of groundwater from seven wells surrounding the liquid waste retention basin. Since that time WEC has been submitting quarterly reports to the NRC summarizing the results of the monitoring program and the status of the study to identify the source of the contamination. The number of monitoring wells was subsequently been increased to 38. No radioactive groundwater contamination has been identified off site.

A geotechnical consultant concluded that the groundwater contamination is flowing in the bedrock underlying the liquid and solid waste complex. Leakage is suspected to be from the liquid waste retention basin since the highest activities are measured in the wells closest to the basin. However, efforts have not conclusively shown that the basin is leaking.

Although the groundwater flow direction is towards Calleys Run (located south of the basin), two test holes located north of the basin have shown Sr-90 concentrations up to 120 pCi/l. Following a review of the WTR records, it was found that three retired catch basins, now dirt filled, had at one time contained highly contaminated water from the reactor. One of these basins is located north of the two test holes. It is, therefore, possible that these basins are the source of the contamination.

Detailed hydrology data are not in the licensing files. However, the groundwater flow rate is estimated by WEC to be 10 to 100 ft/yr.

WEC has performed fluorescent dye tests and has visually inspected the underground drain line that carried all contaminated water to the liquid waste retention basin. None of the groundwater well samples indicated the presence of the fluorescent dye. No evidence of breaks or leaks in the drain piping was detected.

Quarterly well water sampling continues. The NRC on several occasions took split samples for analysis and the results were consistent with WEC results.

WEC is currently pumping the groundwater and treating the liquid through an ion-exchange column. This operation has resulted in lower groundwater concentration levels.

### 3. Description of Wastes

The Waltz Mill site contamination is groundwater containing Sr-90. Data indicate that groundwater concentrations have been as high as 6,200 pCi/l gross beta and 2900 pCi/l Sr-90. Recent monitoring results indicate concentrations of Sr-90 less than the 300 pCi/l limit for water released to unrestricted areas under 10 CFR Part 20. Data on concentrations in the liquid waste retention basins and soils are unavailable in the licensing files. The areal extent of the contamination appears to be large and is unbounded at this time. The licensee will be requested to place additional monitoring wells during the upcoming review of the license renewal application.

WEC has a small quantity of mixed waste in storage. This waste is produced in its decontamination operations. The licensee routinely disposes of this material by transfer to a waste broker.

### 4. Description of the Radiologic Hazard

The principal radiologic hazard associated with the Waltz Mill site involve inhalation, ingestion, intrusion, and groundwater. No immediate threat to public health and safety exists. The liquid waste retention basins have been closed and stabilized minimizing any airborne or transport by surface waters or wind. Intrusion is not expected since WEC



maintains control over the site by fencing and 24 hr/day security. WEC is also pumping and treating the groundwater. This operation, as well as the stabilization of the liquid waste retention basins, appears to be lowering the concentrations in the groundwater. No contamination has been identified off-site.

5. Financial Assurance Required and Responsible Organization

The possession limits for the license are --

All byproduct material (non-dispersive): 7,500 Ci  
All byproduct material (any): 100 Ci  
Source material: 80 kg  
Source material (non-dispersive): 45 Kg  
Special nuclear material: 344 gm; not more than 1 gm U-233;  
and 5 gm plutonium with no more  
than 1.5 gm unencapsulated.

These possession limits require that WEC provide a \$750,000 financial certification by July 27, 1990 and a decommissioning funding plan at the next renewal after July 27, 1990. The NRC is currently reviewing WEC's license renewal application.

Since WEC is a very large company, it is expected that they have the capability to fund any cleanup activities needed.

6. Status of the Decontamination Activities

A decontamination plan for the facilities under License No. SNM-770 was submitted to the NRC on June 22, 1978. Revisions were submitted on August 30, 1978 and November 13, 1978. On December 22, 1978 the plan was approved by the NRC as an amendment to SNM-770. This decontamination plan is very general and does not specifically address all of the current issues. An updated plan will be requested in the current review of the license renewal.

7. NRC Actions Needed and Timing

The NRC is currently reviewing a license renewal application from WEC. The decontamination of the site is one issue which is to be resolved in the review now in progress. Region I staff plan to request from WEC a more comprehensive groundwater monitoring plan, an updated decontamination plan for the inactive facilities not covered under the WTR license, and, depending on the information received, may require implementation of a cleanup program. These plans would be reviewed in conjunction with the license renewal process.

**NRC actions would be:**

	<u><b>Date</b></u>
1. Request groundwater monitoring, decontamination, and implementation plans from WEC	<u>1990 or 1991</u>
2. NMSS to resolve with NRR WTR decommissioning issues	<u>May 1990</u>
3. Review license renewal application	<u>Late 1990 to early 1991</u>
4. Inspect implementation of cleanup	<u>TBD</u>
5. Review WEC close-out survey data	<u>TBD</u>
6. Perform NRC final survey	<u>TBD</u>
7. Terminate license for contaminated areas	<u>TBD</u>

## West Lake Landfill

### 1. Site Identification

West Lake Landfill  
Bridgeton, St. Louis County, Missouri  
Docket Nos.: 040-08035  
                  040-08801  
NRC Project Manager: J. Swift

### 2. Site Description

The West Lake Landfill, property is a 200 acre tract on the outskirts of the city of St. Louis. Limestone was quarried there from 1939 to 1987, and an unregulated landfill was operated on part of the site from 1962 to 1974. Contaminated soil was placed in the landfill in 1973. A concrete plant is operating onsite, as well as a demolition landfill of 22 acres and a sanitary landfill of 52 acres. The property is on the border of the Missouri River valley, about 1.2 miles from the river.

### 3. Description of Wastes

Two areas on the site have a layer of contaminated soil, mostly covered with 3 to 20 feet of other waste. The larger area, about 13 acres, contains about 3.5 million cubic feet of soil contaminated to more than 5 pCi Ra-226 per gram; a 3 acre area contains about 0.5 million cubic feet. The average Ra-226 concentration is about 90 pCi/g, uranium radioactivity concentrations average appreciably smaller, and the Th-230 concentrations are 20 to 100 times those of Ra-226. The contamination originated with residues from extraction of uranium and radium from very rich uranium ores for the AEC.

### 4. Description of Radiologic Hazard

This site poses no immediate threat to the public. Radioactivity has been detected in groundwater monitoring wells onsite, indicating slight contamination above background. Ingrowth of Ra-226 is increasing the radiological hazard. The site is controlled by the property owner.

### 5. Financial Assurance/Viable Responsible Organization

The Cotter Corporation is judged capable of remedial action and is being held responsible, but has not yet indicated willingness.

### 6. Status of the Decommissioning Activities

Cotter Corporation was informed it is being held responsible, and was asked for its plans for remedial action. Subsequently Cotter requested and was provided decontamination criteria.

No remedial action yet. The property owner has not allowed any more waste to be dumped in these areas. NRC had a radiological survey performed in 1981 and an environmental characterization of the site performed in 1983. On October 26, 1989, EPA proposed listing the site on the CERCLA National Priorities List.

7. NRC Actions Needed and Timing

NRC is awaiting a response from Cotter Corporation in March 1990 and will consider further assertion of NRC authority if no timely response is received.

## Whittaker

### 1. Site Identification

Whittaker Corporation  
Greenville, Pennsylvania  
Docket No. 040-07455  
NRC Project Manager: J. Swift

### 2. Site Description

The site is located about three and a half miles south of Greenville on the west side of the Shenango River. The site covers about 16 acres and has eight major buildings and several smaller buildings. Contaminated slag occurs at several places onsite with a large amount near the Shenango River.

### 3. Description of Wastes

The slag material contains natural thorium and uranium. The estimated volume of the slag is 1.05 million cubic feet with a concentration range from less than detectable levels to 6,779 pCi/g of total thorium.

### 4. Description of Radiologic Hazard

This site poses no immediate threat to the public. Whittaker terminated all manufacturing operations within the metals alloys division involving source material in early 1974. Quarterly groundwater sampling since 1974 has not shown any significant offsite migration of radionuclides.

### 5. Financial Assurance/Viable Responsible Organization

The bulk of the site is owned by Whittaker; however, any movement of material along the Shenango River will involve the Army Corps of Engineers and an unknown landowner because some materials are already across the boundaries.

### 6. Status of the Decommissioning Activities

Decontamination plans have been submitted in the past, but none approved by AEC or NRC. Final decommissioning plan will be addressed as part of license renewal in 1993.

Another portion of the site known as Greenville Metals was decontaminated and released for unrestricted use by NRC in 1985.

### 7. NRC Actions Needed and Timing

The staff will review Whittaker's decommissioning plan when submitted for license renewal in 1993.

CSP APP B

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Appendix B

Reactor Decommissioning Status

Received from Ericson  
1/29/90 TM, LLWM, LLRB

Erickson 9/13/89  
Phone No. 21101

# REACTOR DECOMMISSIONING STATUS

TABLE 1

## SHUTDOWN POWER REACTORS-IN SAFSTOR WITH CONTINUED LICENSE

DOCKET NO. REACTOR	THERMAL POWER	LOCATION	SHUT DOWN	PRESENT STATUS	FUEL ONSITE?
50-3 Indian Point-1 PWR	615 MW	Buchanan N.Y.	10/31/74	Possession Only Lic.	Yes
50-10 Dresden 1 BWR	700 MW	Morris Ill.	10/31/78	Possession Only lic.	Yes
50-16 Fermi 1 Fast Breeder**	200 MW	Monroe CO. Mich.	9/22/72	Possession Only Lic.	No
50-18 GE VBWR BWR**	50 MW	Alameda CO. Calif.	12/9/63	Possession Only Lic.	No
50-114 CVTR Pressure Tube, Heavywater**	65 MW)	Parr S.C.	Jan. 67	Byproduct Lic. (St.)	No
50-130 Pathfinder Nuclear Superheat BWR**	190 MW	Sioux Falls S.D.	9/16/67	Byproduct Lic. (NRC)*	No
50-133 Humboldt Bay-3 BWR**	200 MW	Eureka Calif.	7/2/76	Possession Only Lic.	Yes
50-171 Peach Bottom 1 HTGR	115 MW	York Co. Pa.	10/31/74	Possession Only Lic.	No
50-409 LaCrosse BWR	165 MW	LaCrosse Wis.	4/30/87	Possession Only Lic.	Yes
50-267 Fort St. Vrain	842 MW	Platteville Colorado	8/18/89	Shut down	Yes

### \*\* NOTE!

Fermi 1 transferred from NRR to NMSS on July 27 1989.

GE VBWR and Humboldt bay 3 transferred from NRR to NMSS on May 3 1989.

Pathfinder issued AEC byproduct license in 1969. NMSS responsibility.

CVTR issued byproduct license in 1968. State of S.C. responsibility now.

New decommissioning rule does not allow conversion to byproduct license.

Test and research reactors will remain NRR responsibility.

\* Pathfinder dismantling plan under review by NRC/NMSS

TABLE 2

## SHUTDOWN TEST AND NUCLEAR SHIP REACTORS-IN SAFSTOR WITH CONTINUED LICENSE

DOCKET NO. REACTOR	THERMAL POWER	LOCATION	PRESENT STATUS	FUEL ONSITE
TEST REACTORS				
50-22 Westinghouse Test Reactor (Pool Type)	60 MW	Waltz Mill Pa.	Possession Only Lic.	No
50-30 NASA Plum Brook (Pool Type)	60 MW	Sandusky Ohio	Possession Only Lic.	No
50-70 GETR (Pool Type)	50 MW	Alameda Co. Calif.	Possession Only Lic.	No
50-146 Saxton (PWR Test)	28 MW	Saxton Pa.	Possession Only Lic.	No
50-183 GE EVESR (Exp. Superheat)	17 MW	Alameda Co. Calif.	Possession Only Lic.	No
50-200 B&W BAWTR (Pool Type)	6 MW	Lynchburg Va.	Byproduct Lic. (NRC)	No
50-231 SEFOR (Sodium Cooled)	20 MW	Strickler Ark.	Byproduct Lic. (St.)	No
NUCLEAR SHIP				
50-238 NS Savannah PWR	80 MW	Charleston S.C.	Possession Only Lic.	No



TABLE 3

## SHUTDOWN RESEARCH REACTORS-IN SAFSTOR WITH CONTINUED LICENSE

DOCKET NO. REACTOR	THERMAL POWER	LOCATION	PRESENT STATUS	FUEL ONSITE
50-6 Battelle Memorial Institute Pool Type	2 MW	Columbus Ohio	Byproduct License	No
50-47 Watertown Arsenal U.S. Army Pool Type	5 MW	Watertown Mass.	Possession Only	No
50-77 Catholic Univ. AGN-201	0.1 W	Washington D.C.	Possession Only	Yes
50-112 University of Oklahoma AGN-211	100 W	Norman Okla.	Dismantling**	Yes
50-142 Univ. of CA Argonaut	100 KW	Los Angeles Calif.	Dismantling*	No
50-148 Univ. of Kansas Pool	10 KW	Lawrence Kans.	Possession Only	No
50-185 NASA MOCKUP Pool Type	100 KW	Sandusky Ohio	Possession Only	No
50-433 Univ. of CA AGN 211	10 W	Santa Barbara Calif.	Dismantling**	No

\* License terminated. ASLB Dismantling Order in effect.

\*\* Dismantling/Decommissioning Order issued to licensee

TABLE 4

## DICOSSIONED RESEARCH REACTORS (LICENSE TERMINATED)

DOCKET NO. REACTOR	THERMAL POWER	LOCATION	DATE LIC. TERMINATED
50-1 Illinois Inst. of Technology (Water Boiler Research)	100 KW	Chicago Ill.	04-28-72
50-4 USN Research Lab (Pool Type)	1 MW	Washington D.C.	03-18-71
50-8 N.C. State (Aqueous Homogeneous)	100 W	Raleigh N.C.	09-07-66
50-17 Industrial Reactor Labs. (Pool Type)	3 MW	Plainsboro N.J.	11-04-77
50-43 U.S. Naval Post- Graduate School (AGN-201)	0.1 W	Monterey Calif.	10-11-72
50-50 North American Aviation (L-47 Homogeneous)	5 W	Canoga Park Calif.	06-30-58
50-58 Oklahoma State University (AGN-201)	0.1 W	Stillwater Okla.	03-19-74
50-60 U.S. Navy Hospital (AGN-201M)	5 W	Bethesda Md.	06-24-65
50-64 University of Akron (AGN-201)	0.1 W	Akron Ohio	10-09-67
50-84 University of Calif. (AGN-201)	0.1 W	Berkeley Calif.	08-23-66
50-87 Westinghouse Training Reactor	10 KW	Zion Ill	10-27-88
50-94 Rockwell International (L-77)	10W	Canoga Park Calif.	02-11-82
50-98 University of Delaware (AGN-201)	0.1 W	Newark Del.	02-26-79
50-99 B&W Lynchburg Pool	1.0 MW	Lynchburg Va.	07/20/82

TABLE 4 (CONT'D)

## DECOMMISSIONED RESEARCH REACTORS (LICENSE TERMINATED)

DOCKET NO. REACTOR	THERMAL POWER	LOCATION	DATE LIC. TERMINATED
50-101 Gulf United Nuclear (Pawling lattice Test Rig)	100 W	Pawling N.Y.	06-25-74
50-106 Oregon State AGN-201	0.1 W	Corvallis Oregon	11-10-81
50-111 N.C. State Pool	10 KW	Raleigh N.C.	01-13-83
50-114 William March Rice University (AGN-211)	15 W	Houston Texas	09-26-67
50-122 University of Wyoming (L-77)	10 W	Laramie Wyoming	12-05-75
50-124 Virginia Tech Pool	100 KW	Blacksburg VA	08-11-88
50-129 West Virginia AGN-211 P	75 W	Morgantown W.V.	09-07-84
50-135 Walter Reed Medical Center (L-54, Homogeneous Solution)	50 KW	Washington D.C.	07-26-72
50-141 Stanford Univ. Pool Type	10 KW	Stanford Calif.	06-21-83
50-147 Rockwell Intrl.	200 W	Canoga Park Calif.	10-01-80
50-167 Lockheed (Pool Type)	10 W	Dawson Co. Georgia	09-01-60
50-172 Lockheed (Radiation Effects Reactor)	3 MW	Dawson Co. Georgia	08-31-71
50-202 University of Nevada (L-77)	10 W	Reno Nevada	02-24-75
50-212 General Dynamics Fast Critical Assembly	500 W	San Diego Calif.	03-05-65

TABLE 4 (CONT'D)

## DECOMMISSIONED RESEARCH REACTORS (LICENSE TERMINATED)

DOCKET NO. REACTOR	THERMAL POWER	LOCATION	DATE LIC. TERMINATED
50-216 Polytechnic Inst. N.Y. (AGN-201M)	0.1 W	Bronx N.Y.	12-21-77
50-227 General Atomic Co. (TRIGA Mark III)	1.5 MW	San Diego Calif.	12-10-75
50-235 Gulf General Atomic (APFA)	500 W	San Diego Calif.	10-22-69
50-240 Gulf General Atomic (HTGR)	100 W	San Diego Calif.	04-02-73
50-253 Gulf Oil Corp. (APFA III)	500 W	San Diego Calif.	08-10-73
50-310 NUMEC and Common- Wealth of Pa. (Pool)	1 MW	Quehanna Pa.	12-02-66
50-375 Rockwell Intrl. (L-85)	3 KW	Canoga Park Calif.	04-08-87
50-394 Calif. Polytechnic AGN-201	0.1	San Luis Obispo CA.	07-19-85
50-538 Memphis State University	0.1 W	Memphis Tenn.	10-19-88

TABLE 5

## DECOMMISSIONED CRITICAL FACILITIES (LICENSE TERMINATED)

DOCKET NO. REACTOR	MAX. POWER	LOCATION	DATE LIC. TERMINATED
50-13 Babcock & Wilcox (Split Table)	1 KW	Lynchburg Virginia	02-26-88
50-14 Battelle Memorial Plastics Moderated Critical Assembly	200 W	W. Jefferson Ohio	05-11-70
50-23 Nuclear Development Corp. of America (Crit. Ex.)	100 W	Pawling N.Y.	06-22-61
50-24 General Electric (BWR Crit. Ex.)	200 W	Alameda Co. Calif.	12-01-69
50-34 Westinghouse Electric Corp. (PWR Crit. Ex.)	1 KW	Waltz Mill Pa.	12-08-69
50-37 Gen. Dynamics (CIRGA Zirconium Hydride Mod.)	25 W	San Diego Calif.	03-15-60
50-75 NASA (ZPR-1, Solution Type Crit. Fac.)	100 W	Cleveland Ohio	10-13-73
50-87 Westinghouse Electric Corp. (Crit. Ex. Station)	100 W	Waltz Mill Pa.	01-26-72
50-108 Allis Chalmers (Crit. Ex. Fac.)	100 W	Greendale Wis.	01-20-67
50-153 Westinghouse (CVTR MOCKUP, Heavy Water)	3 KW	Waltz Mill Pa.	04-24-63
50-154 Martin Marietta (Fluidized Bed Crit. Ex.)	10 W	Middle River Md.	02-07-66
50-191 Babcock & Wilcox (Plutonium Recycle Crit. Ex.)	50 KW	Lynchburg Va.	06-01-73
50-197 NASA (ZPR-2 Solution Type Crit. Fac.)	100 W	Cleveland Ohio	10-13-73
50-203 GE (Mixed Spectrum Crit. Assembly)	400 W	Alameda Co. Calif.	03-11-68

TABLE 3 (CONT'D)

DECOMMISSIONED CRITICAL FACILITIES (LICENSE TERMINATED)

DOCKET NO. REACTOR	MAX. POWER	LOCATION	DATE LIC. TERMINATED
50-234 Gulf Oil Corp. (Thermionic Crit. Fac.)	200 W	San Diego Calif.	08-10-73
50-246 General Dynamics Corp. ACRE	10 KW	San Diego Calif.	12-30-66
50-290 Gulf United Nuclear (Water Mod. Proof Test Fac.)	100 W	Pawling N.Y.	06-25-74